

First records of Gastrotricha from South Africa, with description of a new species of *Halichaetonotus* (Chaetonotida, Chaetonotidae)

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Abstract

During a survey of the biota of the St. Lucia Estuary in the iSimangaliso Wetland Park, South Africa, a number of Gastrotricha were found among samples of meiofauna. Fresh, marine sediment yielded several specimens belonging to a total of seven species. Of these, two are already known from other regions (i.e., *Dactylopodola australiensis* and *Heteroxenotrichula squamosa*), one is described as new to science (*Halichaetonotus sanctaeluciae* sp. n.), while the remaining four (*Pseudostomella* sp., *Halichaetonotus* sp.1, *Halichaetonotus* sp. 2, *Xenotrichula* sp.) require further collections and analysis, in order to establish the extent of their affiliation to species already described. General appearance, shape of hydrofoil scale and the occurrence of three long spines on the dorsal side make the new species most closely related to *H. australis* and *H. mariagus*. The key differences from these taxa and between *Halichaetonotus sanctaeluciae* sp. n. and *H. aculifer* are discussed.

Keywords

Gastrotricha, meiofauna, new species, South Africa, St. Lucia Estuary, iSimangaliso Wetland Park

Introduction

Marine Gastrotricha from Africa are poorly known. Apart from the pioneering research carried out in Algeria by d'Hondt (1974) and in Somalia by Valbonesi and Luporini (1984, 1987), only the study of Hummon (2011) has been undertaken recently in that region. The latter work includes records of marine gastrotrichs from the Mediterranean and Red Sea coasts of Egypt. In addition, scattered records of species can be found for Tunisia (e.g., Westheide 1972; Todaro et al. 2011) and Kenya (see Balsamo et al. 1992, p. 496). *Macrodasys africanus*, described long ago from Namibia, is the only gastrotrich species known from southern Africa (Remane 1950).

This study was initiated after several gastrotrich specimens were recovered from formalin-fixed samples collected during an ongoing investigation of the biodiversity and ecology of meiofauna inhabiting the St Lucia Estuary (KwaZulu-Natal, South Africa). As identification to species of soft-bodied meiofaunal taxa, like Gastrotricha, is best achieved when the taxonomic characteristics are observed on fresh specimens, the collection of a series of samples was undertaken for a dedicated *in vivo* analysis.

It should be highlighted that a census of the biota populating this area bears special relevance, as the St Lucia Estuary is the largest estuarine lake in Africa, a Ramsar Wetland of International Importance and a crucial ecosystem within the iSimangaliso (formerly Greater St Lucia) Wetland Park, South Africa's first UNESCO World Heritage Site (Taylor 2006).

Methods

All samples containing gastrotrichs were collected from St Lucia beach ($28^{\circ}23' S$; $32^{\circ}25' E$), on the ocean side of the sand berm currently closing the estuary. Sediment samples were collected subtidally (about 40 cm water depth) over a neap tide and spring low tide on 22 February and 7 October 2010, respectively. On each occasion, several samples were collected by gently shovelling 600 ml plastic jars through the top 5–10 cm of sediment until full. Within 1–2 days of collection, samples were sent to Modena (Italy) via courier service. In the lab, gastrotrichs were extracted from the sediment by the narcotization-decantation technique, using an isosmotic (7%) magnesium chloride solution; the fauna-containing supernatant was then poured directly into a 5 cm diameter Petri dish and scanned for specimens under a Wild M8 dissecting microscope, set at 50x magnification (Todaro and Hummon 2008). For taxonomic surveying, the gastrotrichs were removed with a micropipette from the Petri dish, fresh-mounted on slides and observed using a Nikon Eclipse 90i microscope, equipped with Differential Interference Contrast optics (Nomarski) and a DS-5M Nikon digital camera. During the observation, animals were measured with the Nikon ACT-2U software. The description of the new species follows the convention of Hummon et al. (1992, 1993), whereas the position of morphological characters along the body are given in percentage units (U) of total body length measured from anterior to posterior end.

Granulometric analysis of the substrata was carried out according to Todaro et al. (2006). Mean grain size, sorting coefficient, kurtosis, and skewness were calculated by a computerized program based on the equation of Seward-Thompson and Hail (1973).

Abbreviations are as follows: TL, total body length; PhL, pharynx length; FuL, furca length; PhiJ, pharyngeointestinal junction; TbA, adhesive tubes of the anterior series; TbL, adhesive tubes of the lateral series; TbP, adhesive tubes of the posterior series.

Results

Altogether, 24 samples collected on four different occasions were analysed. Gastrotrichs were only found in sandy material collected in February and October 2010 (Table 1). In total, seven species belonging to five genera and four families representing both orders Macrodasyida (2 spp) and Chaetonotida (5 spp) were found. Two species were identified as known taxa (*Dactylopodola australiensis* and *Heteroxenotrichula squamosa*), one is described here as new to science (*Halichaetonotus sanctaeluciae* sp. n.), while for the remaining four taxa the data gathered so far are not sufficient to exclude their affiliation to species already described. They have, therefore, been provisionally named as follows: *Pseudostomella* sp., *Halichaetonotus* sp. 1; *Halichaetonotus* sp. 2 and *Xenotrichula* sp. (Table 1).

Taxonomic account

Order Macrodasyida Remane, 1925 [Rao & Clausen, 1970]

Family Dactylopodidae Strand, 1929

Genus *Dactylopodola* Strand, 1929

***Dactylopodola australiensis* Hochberg, 2003**

http://species-id.net/wiki/Dactylopodola_australiensis

Fig. 1A

Material. 1 specimen, South Africa, KwaZulu-Natal, St Lucia beach, 7 October 2010, SJ Bownes legit.

Morphometry. TL, 319 µm; PhL, 92 µm; PhiJ at U26; TbA, 4 per side; TbL, 1+1+1+2 per side; TbP, 5 per side; Ocellar granules absent.

Remarks. the single specimen found is a young adult at the male phase. Among the nine species of *Dactylopodola* described so far (Hummon and Todaro 2010), the body shape of the specimen from South Africa most resembles *D. australiensis* Hochberg, 2003, *D. indica* (Rao & Ganapati, 1968), *D. mesotyphle* Hummon, Todaro, Ton-giorgi & Balsamo, 1998 and *D. typhle* (Remane, 1927). By virtue of its body size (considering the age), number and arrangement of the adhesive tubes our specimen

Table 1. Gastrotrich taxa found at St. Lucia beach and granulometric characteristics of the microhabitat at the time of sampling during 2010.

Taxon	Sampling date	
	22 February	7 October
<i>Dactylopodola australiensis</i>	-	+
<i>Pseudostomella</i> sp.	+	-
<i>Halichaetonotus sanctaeluciae</i> sp. n.	+	+
<i>Halichaetonotus</i> sp. 1	+	-
<i>Halichaetonotus</i> sp. 2	+	-
<i>Heteroxenotrichula squamosa</i>	+	-
<i>Xenotrichula</i> sp.	+	-
Granulometric parameters		
Mean particle size (phi)	1.95	1.62
Sorting (phi)	0.80	0.77
Kurtosis	3.58	2.55
Skewness	-0.99	-0.10

+, species present; -, species absent.

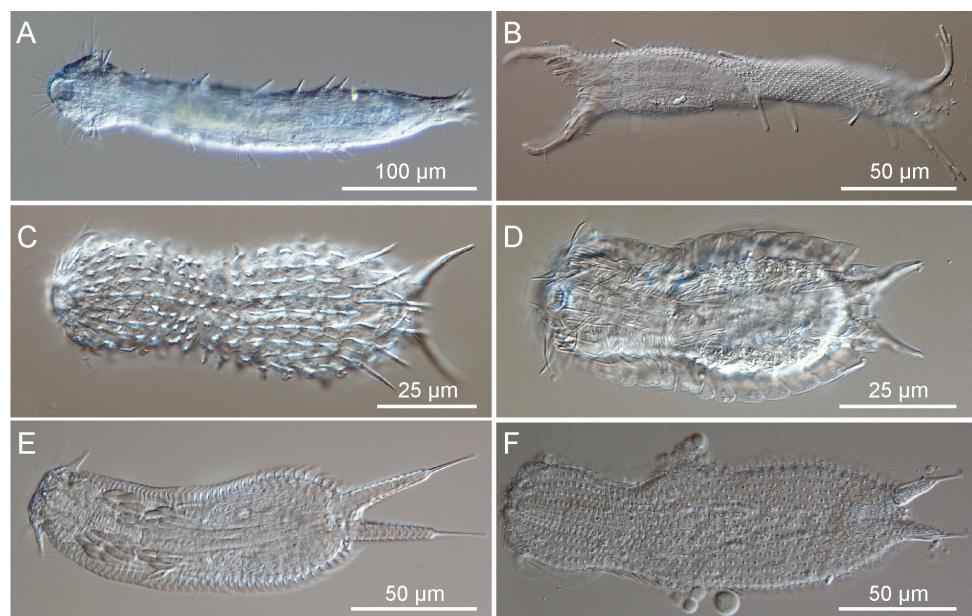


Figure 1. Gastrotricha from St. Lucia beach, South Africa DIC photomicrographs. **A–B** Macrodasyida, **C–F** Chaetonotida. **A**, *Dactylopodola australiensis*, ventral view **B**, *Pseudostomella* sp., twisted juvenile **C** *Halichaetonotus* sp. 1, dorsal view **D** *Halichaetonotus* sp. 2, ventral view **E** *Heteroxenotrichula squamosa*, ventral view **F** *Xenotrichula* sp., dorsal view.

best approaches the morphometric traits of *D. indica* and, especially, of *D. australiensis*. While *D. indica* is reported (Rao and Ganapati 1968) to have only 2 TbA and 4 TbP per side (vs 4 and 5, respectively), *D. australiensis* seems to differ from the South African specimen solely in the length of the pharynx (131 vs 92 µm) and in the position of the pharyngeal-intestinal junction (U34-U35 vs U26) (see Hochberg 2003); it is possible that dissimilarities are due to the early age of the African specimen.

Family Thaumastodermatidae Remane, 1927

Subfamily Thaumastodermatinae Remane, 1927

Genus *Pseudostomella* Swedmark, 1956

***Pseudostomella* sp.**

Fig. 1B

Material. 1 juvenile specimen, South Africa, KwaZulu-Natal, St Lucia beach, 22 February 2010, NAF Miranda legit.

Morphometry. TL, 208.6 µm; PhL, 92 µm; PhIJ at U26; oral palps, 36.4 µm in length, showing 5 dorsal and 6 ventral papillae; cuticular covering made up of relatively large tetrances; TbA, 3 per side; TbL, 5 per side; TbP, 4 per side, 3 at the end of the caudal pedicle and 1 near its base (inner side).

Remarks. The anatomical traits of the animal from South Africa do not seem to match those of any other known species of *Pseudostomella*. However, specimen was a juvenile (i.e., not reproductively mature) and so could not be fully described. Should an adult be found in the future, useful comparisons could be restricted to species bearing a cuticular covering made up of tetrances and relatively long caudal pedicles.

Order Chaetonotida Remane, 1925 [Rao & Clausen, 1970]

Suborder Paucitubulatina d'Hondt, 1971

Family Chaetonotidae Gosse, 1864

Genus *Halichaetonotus* Remane, 1936

***Halichaetonotus sanctaeluciae* sp. n.**

urn:lsid:zoobank.org:act:61F9C96F-6E24-493A-9CE8-7AC2F06F2CF3

http://species-id.net/wiki/Halichaetonotus_sanctaeluciae

Figs 2–3

Type locality. South Africa, KwaZulu-Natal, St. Lucia beach (Lat. 28°23'S; Lon. 32°25'E); among medium, moderately siliceous grains on a high-energy sandy beach at mid-tide level.

Type specimens. Holotype, the 146.5 µm long adult specimen shown in Figure 3.

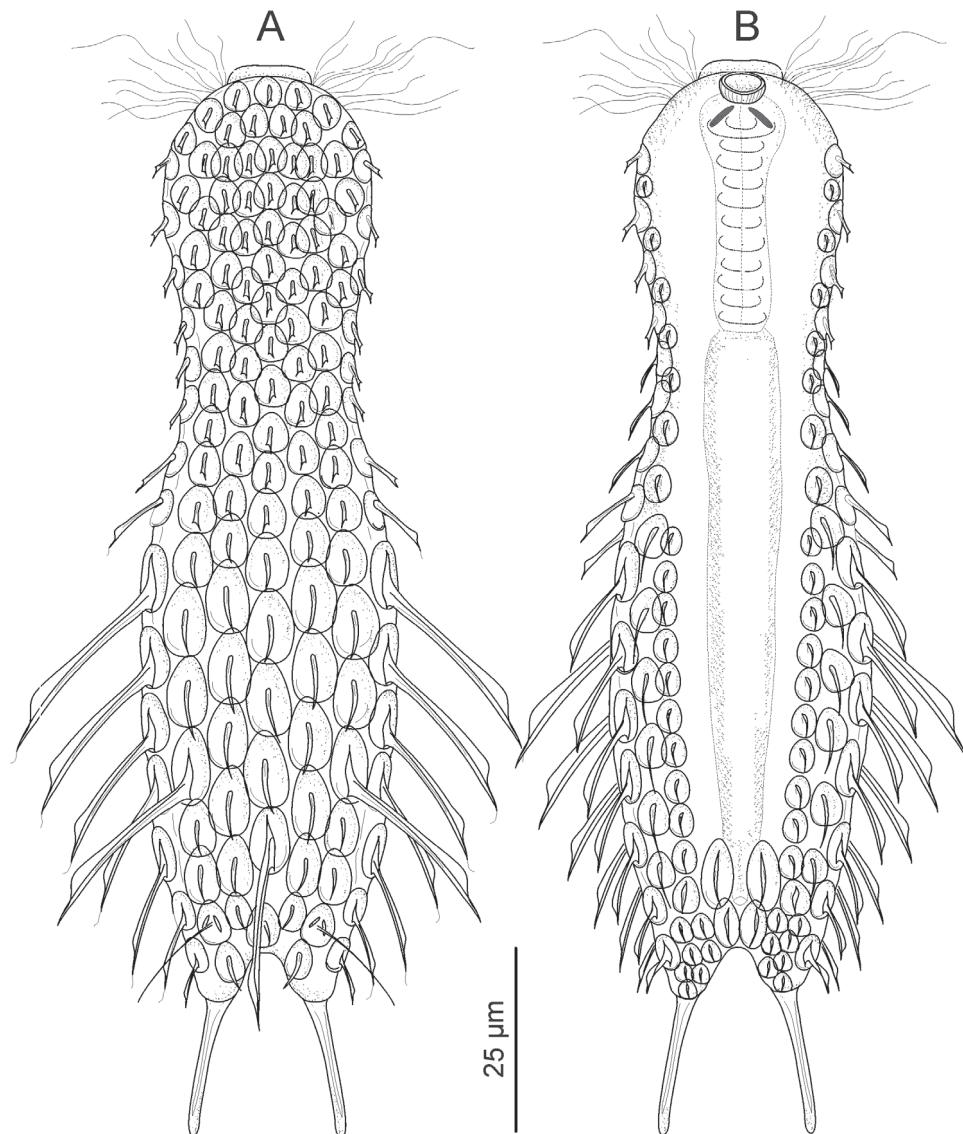


Figure 2. Gastrotricha from St. Lucia beach, South Africa. *Halichaetonotus sanctaeluciae* sp. n., schematic drawings **A** dorsal view **B** ventral view (locomotor cilia omitted).

Material examined. Four specimens, two adults (including the holotype) plus one subadult collected on 22 February 2010 (NAF Miranda legit) and 1 adult collected on 7 October 2010 (SJ Bownes legit)

Diagnosis. Medium-sized *Halichaetonotus* (LT to 146.6 µm), head, neck and trunk well defined; head rounded, lacking hypostomion but with a small cephalion; medium-long furca projecting from the posterior of the trunk. Body enveloped by 15 columns (7 dorsal, 2 lateral + 2 ventrolateral hydrofoil scales, 2+2 ventral small

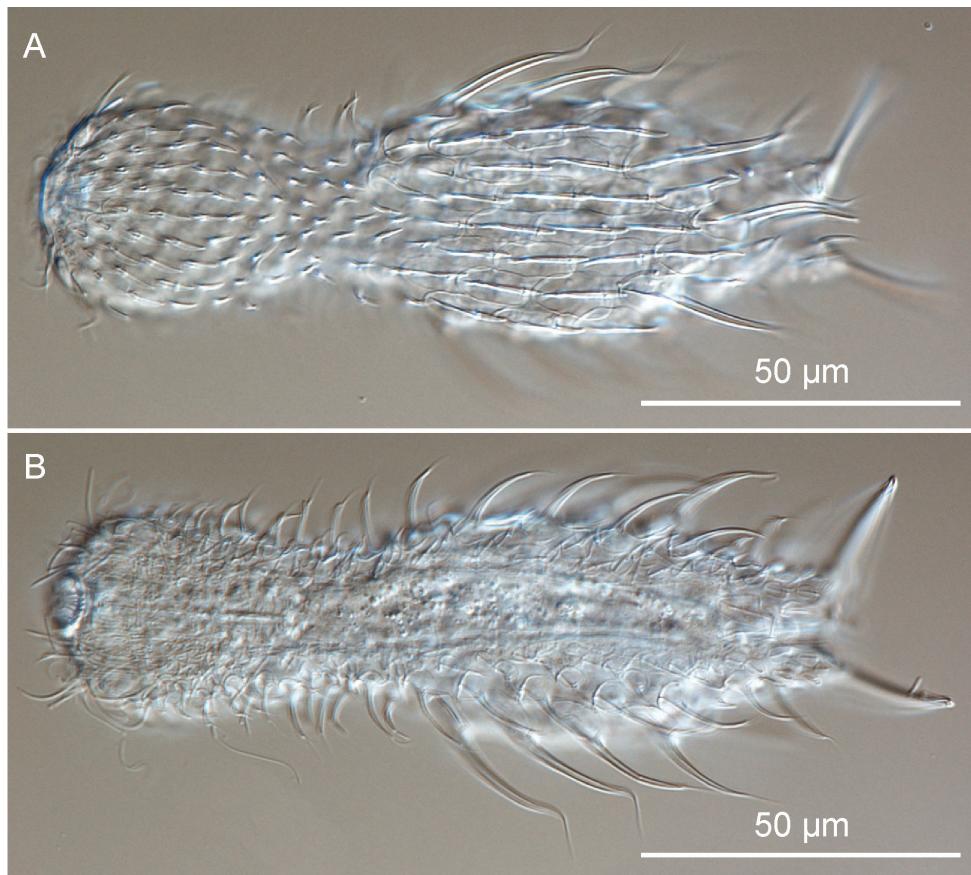


Figure 3. Gastrotricha from St. Lucia beach, South Africa. *Halichaetonotus sanctaeluciae* sp. n., habitus **A** dorsal view **B** ventral view. DIC photomicrographs.

scales) of alternating keeled scales each with 17–19 scales. Scales, round on head and neck becoming oval to semi-elliptical on the trunk; in general, keel extending beyond the edge of the scales as short spiny processes; on three posterior scales, one median and two lateral, keels forming long and robust spines extending beyond end of trunk. Two small spiny scales on dorsal and several keeled scales on ventral base of furca. Laterally and ventrolaterally, 2+2 columns of hydrofoil scales of varying length; ventrally, 2+2 additional columns of smaller scales; locomotory cilia arranged in two longitudinal bands, interciliary ventral field naked except for two pairs of perianal ovoid keeled/spiny scales. Almost circular mouth opening into cylindrical pharynx with 2 teeth, then sack-like intestine and terminal ventral anus. All specimens parthenogenetic, sometimes with single large egg in position dorsal to mid intestine.

Etymology. The specific name alludes to the geographic locality where the new species has been found.

Description. The description is mainly based on an adult specimen, 146.5 µm in total length. Head rounded, slightly elongated along anterior/posterior axis, bearing a shallow cephalion but no pleural lobes or visible hypostomion; neck narrower than head, trunk sac-like, terminating in a furcate caudum. Body widths at the head/neck/trunk/caudum are 31/22.5/34.5/22 µm, at U11/27/58/81, respectively. Caudum of medium length (26.6 µm), paired laterally divergent adhesive tubes (20 µm in length) with a slightly swollen base (6.5 µm), covered by scales.

Cuticular armature. Head, neck, and trunk covered dorsally and lateroventrally by alternating columns (7 dorsal, 1+1 lateral and 1+1 ventrolateral hydrofoil, 2+2 ventral) of 17–19 keeled scales, barely overlapping. On dorsal side, head and neck scales are round (3–5 µm in diameter), while trunk scales are oval to semi-elliptical (9.5 × 5.5 – 12.7 × 6.6 µm). In general, keel on dorsal scales extends beyond the edge of scales as short spiny process; however, on two lateral and one median trunk scales, at U63 and U71, respectively, keels form robust, very long spines projecting 26 µm beyond scales. On posterior trunk region are two oval, double keeled scales (5 × 4 µm) each anchoring a sensorial bristle at U79.5 and a couple of oval spiny scales (4 × 3.5 µm) bearing spines (4–5 µm long) protruding into the furcal indentation. Lateral and ventrolateral spines of hydrofoil scales bearing flattened lamellae, most of which taper into a long hairy process; lamellae bearing spines of the lateral scales are longer than related ventrolateral ones (up to 25 vs up to 19), while lamellae of a column are longest at mid trunk. On ventral side, up to five keeled scales, 3–4 µm long, cover the fleshy portion of each furcal branch; the interciliary field appears naked except for two pairs of oval keeled scales in the perianal region; scales of anterior pair are larger (9.5 × 4.5 µm) than posterior ones (6.0 × 3.5 µm).

Ventral ciliation. paired longitudinal bands extending from U03 to approximately U77; each broadly club-shaped anteriorly, but narrowing considerably from the posterior pharyngeal region; bands approach each other immediately behind the mouth, but remain separate throughout their entire length; individual cilia are about 11 µm in length.

Digestive tract: Mouth of medium size (ca.6 µm in diameter), projecting very slightly ventrally and leading progressively into a 32 µm long pharynx; pharynx muscular, roughly cylindrical (8 µm in diameter), showing a bulb anteriorly (12 µm in diameter); two cuticular teeth are visible within the bulb; pharynx connected to sack-like intestine at pharyngeo-intestinal junction at U25; intestine straight, narrowing posteriorly, anus ventral at U77.

Reproductive tract. Three specimens were in parthenogenetic phase, two of which with a large egg filling much of the trunk.

Taxonomic affinities. Highly variable cuticular armature distinguishes the 30 species of *Halichaetonotus* described so far (Hummon and Todaro 2010, Hummon 2010). The new species most closely resembles *H. marivagus*, Balsamo, Todaro & Tongiorgi, 1992, and *H. australis* Nichols & Todaro, 2005, in that all three species are characterised by three dorsal spines close to the posterior end of the trunk. Spines are longest in *H. australis* (up to 46 µm), intermediate in *H. sanctaeluciae* sp. n. (up to 26 µm) and shortest in *H. marivagus* (up to 15 µm).

Halichaetonotus marivagus known from the Mediterranean, can easily be distinguished from the new species also on the basis of its wide hypostomion, which is absent in *H. sanctaeluciae* sp. n., and for exhibiting a large cephalion that covers much of the dorsal side of its head (Balsamo et al. 1992).

Halichaetonotus australis described from the east coast of Australia, is unique in that the large median dorsal spine precedes the lateral ones (the opposite is true for *H. sanctaeluciae* sp. n.). Moreover, the keel of the dorsal scales does not extend beyond the edge of the scales (Nicholas and Todaro 2005), whereas in *H. sanctaeluciae* sp. n. keels form a spiny process.

The new species also resembles *H. aculifer* (Gerlach, 1953) in terms of size and, most importantly, the shape of the hydrofoil scales. However, the presence of three long spines on the posterior trunk and the absence of ventral interciliary field scales in *H. sanctaeluciae* sp. n. are features that can easily differentiate this species from *H. aculifer* (see Gerlach 1953).

***Halichaetonotus* sp. 1**

Fig. 1C

Material. 1 adult specimen, South Africa, KwaZulu-Natal, St Lucia beach, 22 February 2010, NAF Miranda legit.

Morphometry. TL, 106.2 µm; PhL, 27.2 µm; PhIJ at U29.5; FuL, 21 (adhesive tube 17 µm); dorsal cuticular covering made up of seven columns of 17 overlapping, keeled scales. Scales round (up to 4 µm in diameter) on the head and neck region becoming ovoid (up to 8 × 4) over trunk. With exception of medial one, scales of posterior-most row bear keel extending into a 14 µm-long spine; 1+1 columns of hydrofoil scales ventrolaterally.

Remarks. by virtue of the six spiny scales on the trunk rear, the animal appears different from any other species described so far. Unfortunately, a break of the slide occurred during the observation prevented the examination of the ventral side. Without detailed observations of the ventral scales' shape, size and arrangement, we choose to avoid making a formal description of the species until additional specimens are observed.

***Halichaetonotus* sp. 2**

Fig. 1D

Material. 2 adult specimens and 2 juveniles, South Africa, KwaZulu-Natal, St Lucia beach, 22 February 2010, NAF Miranda legit.

Morphometry. TL, up to 104 µm; PhL, up to 25 µm; PhIJ at U29; FuL, up to 17.5 (adhesive tube 13 µm); dorsal cuticular covering made up of nine columns of 17 slightly overlapping, keeled scales. Scales round (up to 2–3 µm in diameter) on head

and neck region becoming elliptical (up to 5×2 μm) over trunk. Ventrolaterally, 1+1 columns of hydrofoil scales bearing large lamellae.

Remarks. Morphometry and general appearance of the specimens found at St Lucia match the metric and meristic characteristics of the cosmopolitan *Halichaetonotus decipiens* (Remane, 1929). Unfortunately, the detritus attached to the ventral side of one of the two adults and the large egg inside the second, prevented the observation of the cuticular details on the ventral side. Consequently, that identification to species cannot be made without reasonable doubts.

Family Xenotrichulidae Remane, 1927

Genus *Heteroxenotrichula* Wilke, 1954

Heteroxenotrichula squamosa Wilke, 1954

http://species-id.net/wiki/Heteroxenotrichula_squamosa

Fig. 1E

Material. 1 adult specimen, South Africa, KwaZulu-Natal, St Lucia beach, 22 February 2010, NAF Miranda legit.

Morphometry. TL, 179 μm ; PhL, 41.5 μm ; PhiJ at U25.6; FuL, 52.3 μm (adhesive tube 20.5 μm); Dorsal cuticular covering made up of seven columns of 43–45 overlapping, scales extending laterally as hydrofoil scales. Ten flat scales on the inner margin of each furcal branch. Two pairs of head sensory cirri, 17–28 μm in length, 1 pair of head tentacles, 11.5 μm in length.

Remarks. morphometry and general appearance of the specimen from St. Lucia is in general accordance with data reported for the cosmopolitan *H. squamosa*; in particular, the South African specimen appears of a size intermediate between individuals of the Mediterranean populations described by Wilke (1954) and Luporini et al. (1973) and specimens described from the Atlantic coast of France by Ruppert (1979).

Genus *Xenotrichula* Remane, 1927

Xenotrichula sp.

Fig. 1F

Material. 1 adult specimen. South Africa, KwaZulu-Natal, St Lucia beach, 22 February 2010, NAF Miranda legit.

Morphometry. TL, 196 μm ; PhL, 49.5 μm ; PhiJ at U29; FuL, 27 μm (adhesive tube 10.2 μm); dorsal cuticular covering made up of 15 columns of 48 pedunculated scales (median column).

Remarks. Morphometry and general appearance of the specimens found at St Lucia fall within the taxonomic range of the cosmopolitan *Xenotrichula intermedia*

Remane, 1934 and of an as yet unnamed *Xenotrichula* sp. from Kuwait. The latter two species are siblings, sharing almost identical external morphology but very different organization of the muscular system (see Leasi and Todaro 2009). Technical reasons (several specimens are necessary) prevented the use of confocal laser scanning microscopy to study the organization of the muscular system in the only specimen available. Consequently, identification of the animal found at St. Lucia could not be made with sufficient confidence.

Conclusion

The first report of gastrotrichs from South Africa shows that, despite the relatively low abundance of taxa retrieved so far, the potential for the discovery of new species unknown to science is remarkable. Soft-bodied organisms such as gastrotrichs must be processed fresh and live, in order to optimise observation of their key taxonomic characteristics. The unavoidable time delay (≥ 7 days) incurred between sample collections and analysis, due to the remote distance between the study site (St Lucia, South Africa) and the laboratory of analysis (Modena, Italy), has probably led to the loss of a number of potentially critical specimens in the samples (e.g. adult stages) and may account for the absence of gastrotrichs from some of the samples. It is, therefore, necessary to consider for the future the option of completing both sampling and analysis on site. This would also allow the collection of sufficient material to complement the traditional morphological studies with more advanced techniques, such as molecular analysis and confocal microscopy. This may prove invaluable towards the resolution of what is currently known in biogeography as the “meiofauna paradox” (Giere 2009). Indeed, it is necessary at this stage to ascertain whether the taxa that could not be conclusively identified to species level are actually already known cosmopolitan species, with broad geographic distribution, or rather new and localized species but “cryptic” in the sense that they cannot be distinguished only on the basis of external morphological characters. This will provide a valuable contribution towards the knowledge of the biodiversity of the St Lucia Estuary and the broader ecosystem of the World Heritage Site of which this wetland is an integral part.

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Taxonomic contribution to the *Aleiodes melanopterus* (Erichson) species-group (Hymenoptera, Braconidae, Rogadinae) from Brazil

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Abstract

The *Aleiodes melanopterus* (Erichson, 1848) species-group includes 21 species, of which seven are known from the Neotropical region: *A. flavistigma* Shaw, 1993, *A. lucidus* (Szépligeti, 1906), *A. melanopterus*, *A. mexicanus* Cresson, 1869, *A. politiceps* (Gahan, 1917), and the new species *A. shaworum* sp. n. and *A. vassununga* sp. n. Distribution ranges of *A. melanopterus*, *A. flavistigma* and *A. lucidus* are extended and the female of *A. lucidus* is described. A key to the Neotropical species of this species-group is presented.

Keywords

Brazil, new species, *Eucystomastax*, distribution

Introduction

The Neotropical species of *Aleiodes melanopterus* (Erichson, 1848) species-group has been treated as several different genera until Shaw (1993) clarified its relationship with others *Aleiodes* species-groups. The Neotropical lineage was then proposed to be a subgenus within *Aleiodes*, namely *Eucystomastax* Brues, 1912, including five nominal spe-

cies: *flavistigma* Shaw, 1993, *lucidus* (Szépligeti, 1906), *melanopterus* (Erichson, 1848), *mexicanus* Cresson, 1869 and *politiceps* (Gahan, 1917) (Yu et al. 2005). In a broad sense the *melanopterus* group is present in Palaearctic, Nearctic, and Neotropical regions (Marsh and Shaw 1999), and includes 21 species, composing a monophyletic group defined by the large oral space and narrow clypeus (Fortier and Shaw 1999). All Neotropical species plus *politiceps* (Gahan, 1917) comprises a derived subgroup within the *melanopterus* group, defined by having pectinate tarsal claws and strongly protruding clypeal carina (Shaw 1993; Fortier and Shaw 1999).

Material and methods

A portion of examined specimens, deposited at DCBU (Universidade Federal de São Carlos), comes from several different surveys throughout Brazil. Additional specimens were loaned from several entomological collections in Brazil, deposited temporally at DCBU: Museu Paraense Emílio Goeldi (MPEG), Instituto Nacional de Pesquisas da Amazônia (INPA), Museu Nacional do Rio de Janeiro (MNRJ), Museu de Zoologia da Universidade de São Paulo (MZUSP), Coleção Entomológica Padre Jesus S. Moura – Departamento de Zoologia da Universidade Federal do Paraná (DZUP). We examined 194 specimens of the *Aleiodes melanopterus* species-group, all collected in Brazil.

Terminology used mostly follows Shaw (1993), exception made for some micro-sculpture characters that follows Marsh and Shaw (1999). Abbreviations used in the descriptions follows strictly that used by Shaw (1993), namely: BL= body length, excluding antenna and ovipositor; FWL= fore wing length; F#= flagellum #; MS= malar space; EH= maximum eye height; EW= maximum eye width; TW= temple width; OS= oral space, maximum width in anterior view; OOD= ocellar–ocular distance (shortest distance from eye margin to lateral ocellus); OD= ocellus diameter (maximum width of lateral ocellus); T#= tergum #; OL= ovipositor length; HBTL= hind basitarsus length; HTS= hind tibial spur length (longest spur); R#= radius segment #. Colour pictures were taken by stereomicroscope. Greyscale pictures were taken at SEM in low vacuum.

Results

We identified all previously known South American species among examined material, i.e. *Aleiodes flavistigma* Shaw, 1993, *Aleiodes lucidus* (Szépligeti, 1906), *Aleiodes melanopterus* (Erichson, 1848); plus two new species described below: *Aleiodes shaworum* sp. n. and *Aleiodes vassununga* sp. n. One of the specimens examined constitutes the first recorded female of *A. lucidus*, and also the first record of this species from Brazil. The distribution range of *A. flavistigma* is extended to Minas Gerais State in Brazil; this is the first record of this species outside of Santa Catarina State. Some morphological features of the Brazilian *A. melanopterus* specimens are described and discussed.

Key to Neotropical species of *Aleiodes melanopterus (Eucystomastax)* species-group (modified from Shaw 1993)

- | | | |
|---|--|-----------------------------------|
| 1 | Metasoma orange to reddish brown (Fig. 2)..... | 2 |
| - | Metasoma black apically or mostly black (Fig. 1) | 4 |
| 2 | First and second metasomal terga striate; body bicoloured, head and legs black; malar space narrow, about ½ basal width of mandible | |
| | <i>A. mexicanus</i> Cresson | |
| - | First and second metasomal terga strongly costate (Fig. 14); body unicoloured (Fig. 2); malar space about equal to basal width of mandible | 3 |
| 3 | Pterostigma yellow (Fig. 2) | <i>A. vassununga</i> sp. n. |
| - | Pterostigma black..... | <i>A. politiceps</i> (Gahan) |
| 4 | Notauli absent or very shallow anteriorly, mesonotum entirely smooth (Fig. 10); epicnemial carina effaced dorsally or completely absent (Fig. 11)..... | |
| | <i>A. lucidus</i> (Szépligeti) | |
| - | Notauli distinct, although smooth (Fig 8); epicnemial carina entirely present (Fig. 12)..... | 5 |
| 5 | Pterostigma yellow | <i>A. flavistigma</i> Shaw |
| - | Pterostigma black..... | 6 |
| 6 | Clypeus strongly protruding (Fig. 7); hind coxa smooth dorsally; mesonotum orange, pronotum and fore coxa often orange..... | <i>A. melanopterus</i> (Erichson) |
| - | Clypeus not strongly protruding (Fig. 6); hind coxa striated dorsally (Fig. 9); pronotum, mesonotum and fore coxa black (Fig. 1)..... | <i>A. shaworum</i> sp. n. |

***Aleiodes flavistigma* Shaw, 1993**

http://species-id.net/wiki/Aleiodes_flavistigma

Material examined. Brazil: 3 females, Nova Teutônia, SC, X.1967, F. Plaumann col.; 1 female, Extrema, MG, 25.XII.1990, E. Mariano col.

Distribution. Brazil, Minas Gerais and Santa Catarina States.

***Aleiodes lucidus* (Szépligeti, 1906)**

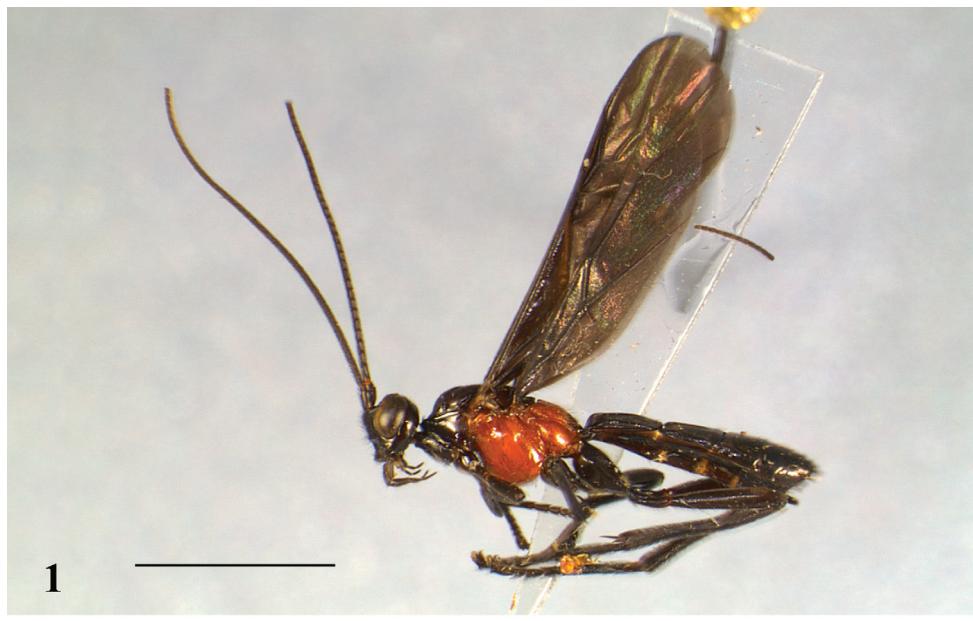
http://species-id.net/wiki/Aleiodes_lucidus

Figs 10, 11

Macrostomion lucidus Szépligeti 1906: 609

Material. Female. Fazenda São João, Diamantina, MT, Brazil, 450m, 5.II.1981, Ekis & Young col.

Description. Female. Body length 12 mm, fore wing length 11.6 mm.



1



2

Figures 1,2 (scale line = 4 mm). Habitus left: **1** *Aleiodes shaworum* sp. n. **2** *A. vassununga* sp. n.

Head. Flagellum broken at F40, F1 2 times longer than wide, F2 1.8 times longer than wide, flagellomeres beyond second about as long as wide; malar space $\frac{3}{4}$ basal width of mandible; MS/EH 0.33; TW/EW 0.67; occipital carina weak ventrally, not meeting the hypostomal carina; oral opening width 1.16 times clypeo-antennal distance; clypeus height 0.3 times its width, protruding and bordered by carina; OS/MS 2.08; OOD/OD 1.33; face smooth, swollen medially; temple smooth; maxillary palpal segments 2–4 swollen.

Mesosoma. Entirely smooth; notauli very shallow anteriorly, otherwise absent (Fig. 10); epicnemial carina nearly absent (Fig. 11); precoxal sulcus absent; propodeum with median carina complete. Legs: tarsal claws pectinate; hind coxa smooth dorsally. Wings: dusky; R1/R2 0.42; R1/recurrent vein 0.62; 1CUa/1cu-a 1.85; basella/me-diella 0.4.

Metasoma. T1 length/width 1.15; T2 length/width 0.7; T3 length/width 0.58; all terga smooth except for medio-longitudinal carina on T1 and T2; OL/HBTL 0.22; HTS/HBTL 0.3.

Colour. Body colour black, except mesothorax orange to infuscate orange.

Distribution. Bolivia, Mapiri and Santa Cruz; Brazil, Mato Grosso.

Comments. This species was known only from male until the present study. The female is very similar to male, but has a larger body size, and differs in some wing vein proportions and the smoother face. The diagnostic characters of the species (e.g. notauli virtually absent, whole body with smooth sculpturing, reduced epicnemial carina) are present in the female specimen examined.

Aleiodes melanopterus (Erichson, 1848)

http://species-id.net/wiki/Aleiodes_melanopterus

Figs 3, 7

Rogas melanopterus Erichson, 1848: 588

Macrostomion peruvianum Szépligeti, 1904: 193

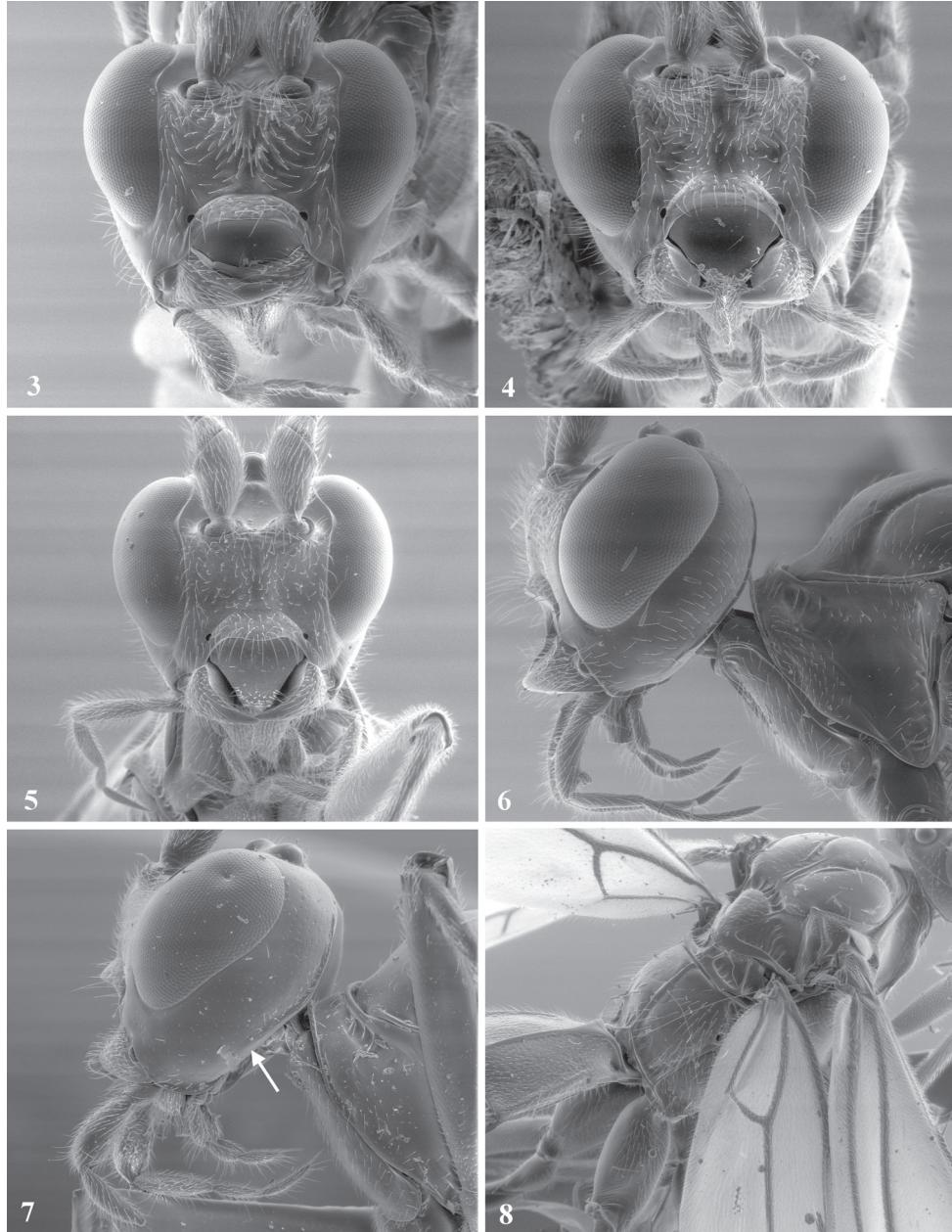
Rhogas rufithorax Cameron, 1911: 313

Rhogas fortipalpus Cameron, 1911: 314

Rhogas forticarinatus Cameron, 1911: 314

Eucystomastax bicolor Brues, 1912: 223

Material examined. 74 females and 108 males. Brazil. Acre (AC): Cruzeiro do Sul, Rio Branco; Amazonas (AM): Serra dos Porcos; Espírito Santo (ES): Fundão, Santa Teresa; Goiás (GO): Anápolis, Goiânia – “Campinas”, Jataí; Mato Grosso (MT): Aripuanã, Alta Floresta, Barra do Tapirapé, Chapada dos Guimarães, Itiquira, Jaçanã – P.N. Xingu, Rondonópolis; Mato Grosso do Sul (MS): Campo Grande, Dourados; Minas Gerais (MG): Araxá, Corinto, Passos; Pará (PA): Barreirinha, Belém, Canindé, Parauapebas –



Figures 3–8. **3** *Aleiodes melanopterus* face **4** *Aleiodes shaworum* sp. n. face **5** *Aleiodes vassununga* sp. n. face **6** *Aleiodes shaworum* sp. n. head left **7** *Aleiodes melanopterus* head left arrow at end of occipital carina **8** *Aleiodes shaworum* sp. n. thorax dorsal.

Serra Norte, Peixe-Boi, Redenção – Gorotire, São Félix do Xingu, Serra Norte; Paraná (PR): Curitiba, Maringá, Ponta Grossa, Rolândia, São José dos Pinhais; Rio de Janeiro (RJ): Santa Maria Madalena; Rio Grande do Sul (RS): Santa Maria, São Leopoldo;

Rondônia (RO): Ouro Preto d'oeste, Porto Velho, Vilhena; Santa Catarina (SC): Nova Teutônia; São Paulo (SP): Barueri, Cananéia – Ilha do Cardoso, Castilho, Caraguatatuba, Juquitiba, Luís Antônio, Monte Alegre, Nova Europa, Onda Verde, Rio Claro, Salesópolis, São Carlos, São Paulo, Tabatinga, Ubatuba, Vargem Grande Paulista.

Morphological notes on Brazilian specimens. Head. Occipital carina of all examined specimens is absent ventrally, thus occipital and hypostomal carina do not meet (Fig. 7). This is probably a misinterpreted character in Shaw (1993) corrected by Fortier and Shaw (1999) (character 20, state 1 for *melanopterus*); face sculpture variable, smooth to rugose, rugosity concentrated near raised median area when present (Fig. 3).

Colour variation. The examined specimens present distinct colour pattern variation. Propodeum always orange; metasoma black in virtually all specimens (97%); hind coxa black (99% of specimens); mid coxa somewhat lighter than hind; fore coxa bright orange in 97% of the specimens, contrasting with remainder black leg; one of the examined specimens has dark pronotum and propleuron.

Distribution. South America, from Suriname to Northern Argentina (North to South), and from South-eastern Brazil to Eastern Peru (East to West). Not recorded in the East of Andean Cordillera, Central America (Shaw 1993), and Northeast Brazilian region. South American countries with records: Argentina, Bolivia, Brazil, Ecuador, Paraguay, Peru and Suriname.

Aleiodes shaworum sp. n.

urn:lsid:zoobank.org:act:27156FC8-61DA-4E1C-9065-5B68F29B3522

http://species-id.net/wiki/Aleiodes_shaworum

Figs 1, 4, 6, 8, 9, 12, 13, 15

Material. Type locality: Brazil, São Paulo, Juquitiba, Sítio Sonho do Vovô, Atlantic forest.

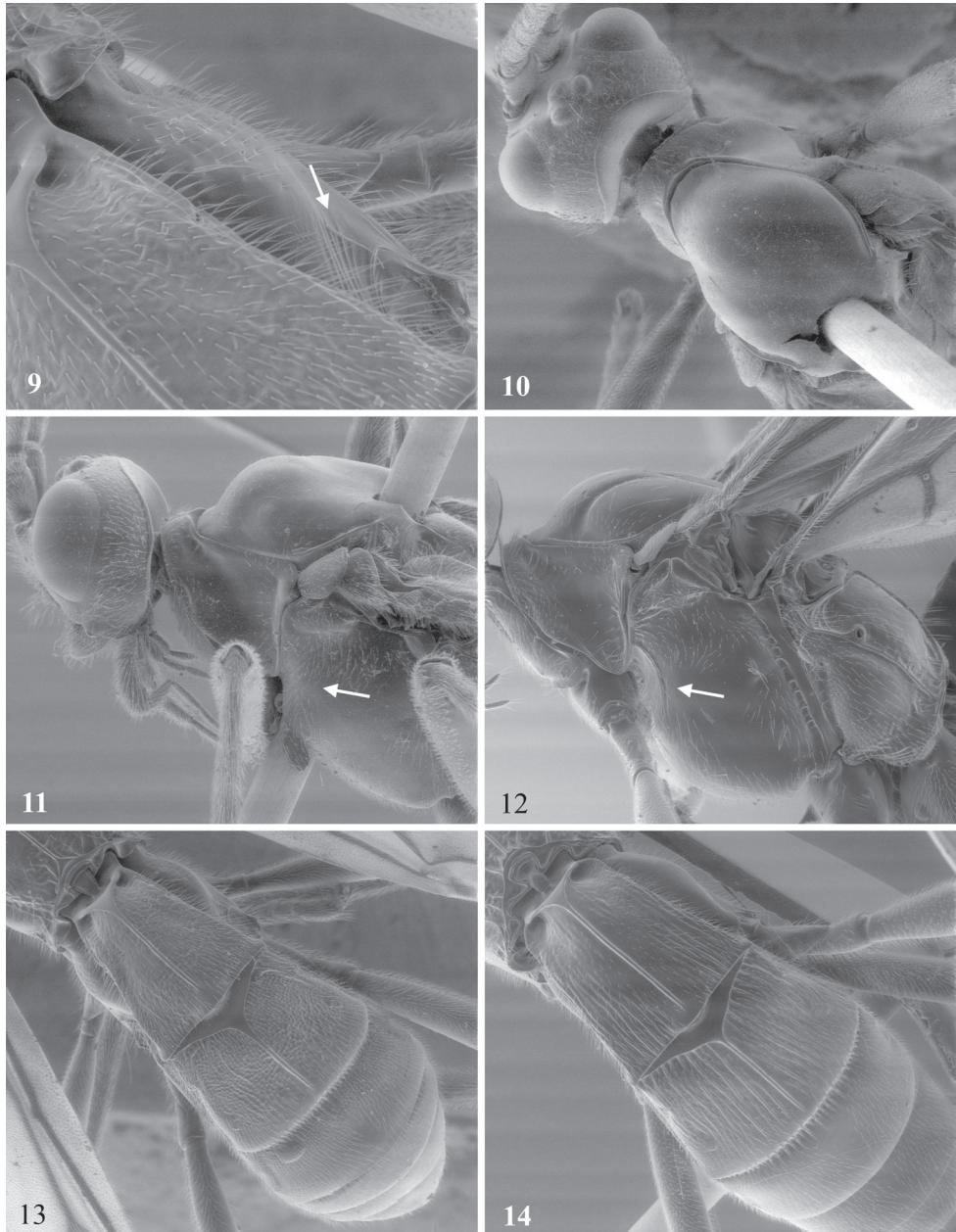
Type specimens. Holotype, female, pinned. Original label: “Sítio Sonho do Vovô, Juquitiba – SP – 22-IV-1988 – (V) L.A. Joaquim, col.” DCBU / UFScar, São Carlos.

Paratypes (DCBU): 1 female, same as holotype; 2 males, Brazil, Barueri, SP, 11.V.1966 and 22.I.1966; 1 male: Brazil, Estação Florestal, Caraguatatuba, SP, 40 m, VII.1965.

Diagnosis. This species is similar to *A. melanopterus*. It can be distinguished by colour pattern: mesonotum black, contrasting with orange mesopleuron, metapleuron, and propodeum; smaller oral opening and clypeus not strongly protruding; striated sculpture on dorsal part of hind coxa; fore wing vein R1 relatively shorter.

Description. Female. Body length 9–9.2 mm, fore wing length 8.2 mm.

Head (Fig. 4). Flagellum with 60 flagellomeres, F1 2.5–3 times longer than wide, F2 about twice longer than wide, remaining flagellomeres almost twice as long as wide; malar space $\frac{1}{2}$ basal width of mandible; MS/EH 0.2; TW/EW 0.62; occipital carina absent ventrally, not meeting hypostomal carina (Fig. 6); oral opening width slightly greater than clypeo-antennal distance; clypeus height/width 1/3; clypeus not protrud-



Figures 9–14. **9** *Aleiodes shaworum* sp. n.: part of first metasomal terga and hind coxa dorsal surface arrow at microsculpture striation on hind coxa. **10,11** *Aleiodes lucidus*: **10** head and mesoscutum dorsal **11** head and mesonotum left arrow indicating absence of epicnemial carina. **12** *Aleiodes shaworum* sp. n. mesopleuron left arrow at epicnemial carina. **13 14** Metasoma dorsal: **13** *Aleiodes shaworum* sp. n. **14** *Aleiodes vassununga* sp. n..

ing, without carinate boarder; OS/MS 3.1–3.2; OOD/OD 0.87; face rugo-striate; frons and vertex smooth; temples smooth scattered with punctuations near occipital carina; maxillary palpus swollen, especially segments 2 and 3.

Mesosoma (Fig. 8). Pronotum smooth laterally and middorsally, granular-rugulose anteriorly; propleuron smooth; mesonotum weakly coriaceous; mesoscutum with short median posterior carina; notauli weakly scrobiculate; mesopleuron smooth and shiny, precoxal sulcus absent; epicnemial carina complete; propodeum smooth to weakly coriaceous dorsally, carinate-rugose basally, median carina complete. Legs: tarsal claws pectinate; hind coxa dorsally striate, same sculpture occasionally present on mid and fore coxa (Fig. 9). Wings (Fig. 15): dusky; R1/R2 0.29–0.33; R1/recurrent vein 0.38–0.4; 1CUa/1cu-a 1.7–2.5; basella/mediella 0.41–0.47.

Metasoma (Fig. 13): T1 length/width 1.19–1.25; T2 length/width 0.73–0.75; T3 length/width 0.48–0.51; T1 and T2 weakly rugose, apically smooth, raised triangular smooth area present; reminder metasomal terga smooth; OL/HBTL 0.21; HTS/HBTL 0.27–0.36.

Colour (Fig. 1): Black; mesopleuron, metapleuron and propodeum bright orange.

Male. Essentially as the female, but with slightly larger eyes; body length 10 mm; flagellum 59–63F.

Etymology. The species is named in honour to Scott Shaw, for his contribution to the knowledge on this group.

Distribution. Brazil, State of São Paulo, Brazilian Atlantic Forest.

Comments. Despite the superficial resemblance with *melanopterus*, this species have quite distinctive characters, including the lack of a strongly protruding clypeus, which has been considered one of the synapomorphies for the Neotropical *melanopterus* species-group clade (Shaw 1993; Fortier and Shaw 1999).

Aleiodes vassununga sp. n.

urn:lsid:zoobank.org:act:25462065-6F95-4324-9189-9D82350575B1

http://species-id.net/wiki/Aleiodes_vassununga

Figs 2, 5, 15

Material. Type locality: Brazil, São Paulo, Santa Rita do Passa Quatro, Parque Estadual de Vassununga – Mata Praxedes, 21°40'56"S, 47°37'13"W, Semi-deciduous Atlantic forest.

Type specimens: Holotype, female, pinned. Original label: "Sta. Rita P. Quatro, SP, Brasil. Pq. Est. De Vassununga – Mata Praxedes – S21°40'56", W47°37'13" – 31.III.2006 – Armadilha Malaise – A.M.P. Dias col." DCBU / UFSCar, São Carlos.

Paratype (DCBU): 1 Male, Brazil, SP, Barueri, 6.XII.1966, K. Lenko col.

Diagnosis. This species resembles the North American species *A. politiceps* and *melanopodus* Marsh and Shaw, 1999, both on body colour and the coarse sculpture on the

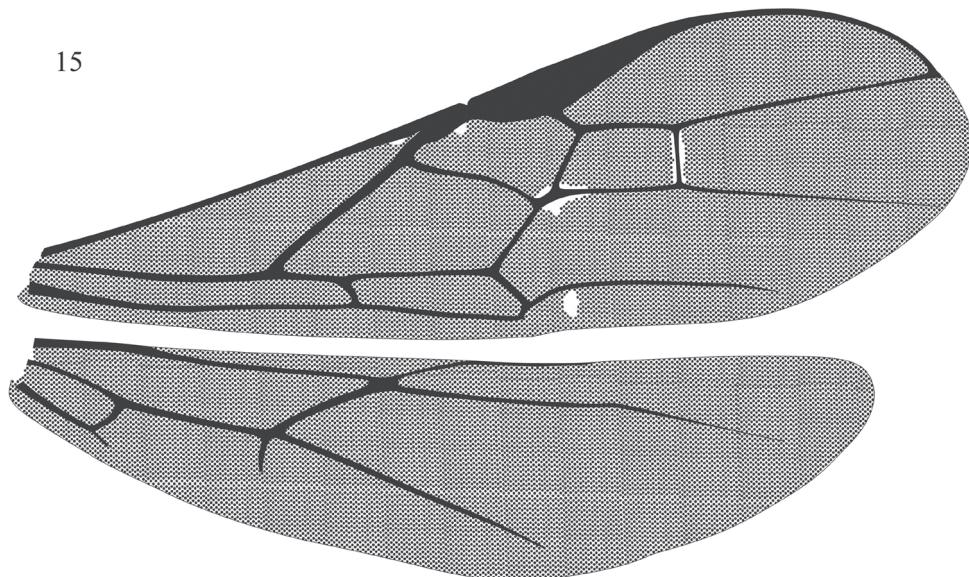


Figure 15. *Aleiodes shaworum* sp. n. right wings.

metasoma, but it can be readily distinguished by the bright yellow spot on pterostigmal area of fore wing, as in *flavistigma*. In the key to North American species it will run to *A. melanopterus*, from which can be distinguished by the shorter ovipositor and smooth face sculpturing. It is also the only South American species without a black metasoma.

Description. Female (Holotype). Body Length 10.8 mm, fore wing length 8.8 mm.

Head (Fig 5). Flagellum with 68 flagellomeres, F1 width 0.4 times its length, F15 0.8 times wider than long; malar space 0.3 times eye height, 0.8 times basal width of mandible; TW/EW 0.55; occipital carina not meeting hypostomal carina; oral opening width 1.26 times clypeo-antennal distance, OS/MS 2.5; OOD/OD 1.15; head entirely smooth; clypeus strongly protruding and margined by carina; maxillary palpus slightly swollen.

Mesosoma. Almost entirely smooth, pronotum sparsely rugose laterally; mesoscutum with short postero-median carina; notaui smooth, with some weak crenulae anteriorly; precoxal sulcus absent; epicnemial carina complete; propodeum smooth dorsally, carinate-rugose basally; median carina complete. Legs: tarsal claws pectinate; hind coxa dorsally smooth. Wings: dusky with yellow spot on pterostigmal area (Fig. 2); R1/R2 0.33; R1/recurrent vein 0.42; 1CUa/1cu-a 1.11; basella/mediella 0.39.

Metasoma (Fig. 14). T1 length/width 1.21; T2 length/width 0.76; T3 length/width 0.41; T1, T2 and basal half of T3 strongly costate; OL/HBTL 0.25; HTS/HBTL 0.25.

Colour (Fig. 2): Body entirely reddish brown, including scapus; antenna, ocelli, eyes, labial palpi, maxillary palpus segments 2–5 and ovipositor sheaths black; legs darkening apically from the tibia.

Male. Similar to female but face with some transverse rugositie; body length 11 mm; fore wing length 8.8 mm; flagellum with 63 flagellomeres.

Etymology. The name of species refers to locality of collection of material for study.

Distribution. Brazil, State of São Paulo.

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Revision of the new world genus *Crassomicrodus* Ashmead (Hymenoptera, Braconidae, Agathidinae), with an identification key to species

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Abstract

A key to species and descriptions are presented for 14 species of the New World genus *Crassomicrodus* Ashmead. Seven new species, *C. azteca*, *C. clypealis*, *C. costaricensis*, *C. jalisciensis*, *C. mariae*, *C. oaxaqueuensis*, and *C. olgae* are described. *C. fenestratus* (Viereck) is synonymized with *C. nigriceps* (Cresson). *C. melanopleurus* (Ashmead) is recognized as a valid species.

Keywords

insecta, taxonomy, parasitoid wasps, new species, Ichneumonoidea

Introduction

The agathidine wasp genus *Crassomicrodus* was erected by Ashmead (1900), with the type species *Microdus fulvescens* (Cresson, 1865). A few years later Bradley (1916) pointed out that *Microdus divisus* (Cresson, 1873), the type species of *Epimicrodus* (Ashmead, 1900), shared many characters with the designated type of *Crassomicrodus*, and therefore synonymized *Epimicrodus* Ashmead under *Crassomicrodus*. Members of *Crassomicrodus* are characterized by a short ovipositor, tarsal claws without basal lobes, and the lack of pegs near the apex of the lateral surface of the hind tibia. *Crassomicrodus* is closely related with the genus *Agathirsia* Westwood (Pucci and Sharkey 2004). The original placement of *Crassomicrodus* and *Agathirsia* in the tribe Agathidiini was proposed by Sharkey (1992) but recently Sharkey et al. (2006), using both molecular and morphological data sets, proposed the tentative inclusion of these genera in the tribe Earinini.

Prior to this publication *Crassomicrodus* contained eight species recognized (Muesebeck et al. 1951, Shenefelt 1970, Marsh and Carlson 1979, Figueroa et al. 2008). Previous to 2008 there were nine nominal species but Figueroa et al. (2008) synonymized *C. medius* Cresson under *C. fulvescens*. Six species were included in the Hymenoptera of America North of Mexico (Muesebeck 1927). One species was described from Puerto Rico (Viereck 1913), and Marsh (1960) added one species collected in the U.S.A. Other nominal species, such as *C. nigricaudos* (Viereck 1905) and *C. pumilus* = *Epimicrodus pumilus* (Szépligeti 1913, Brues 1926) were included in the genus, but these were misidentified. *C. nigricaudos* was transferred to *Agathirsia* by Muesebeck (1927), and *Epimicrodus pumilus* was transferred to the genus *Bassus* by Pucci and Sharkey (2004). According to Sharkey (1997) species of *Crassomicrodus* are restricted to the New World, and can be found from southern of Canada to Costa Rica, although in this study we found one species from Colombia. *Autographa californica* (Speyer), a lepidopteran, is the unique host record for *Crassomicrodus*, i.e., *C. fulvescens* (Cresson) (Sharkey 1997, Figueroa et al. 2008).

In this revision, we redescribe seven species, describe seven new species of *Crassomicrodus*, and synonymize *C. nigriceps* under *C. fenestratus*. We also recognize *C. melanopleurus* as a valid species and provide an identification key for all species of *Crassomicrodus*.

Materials and methods

Species treatments. Descriptions of all included species are based on all material examined. All measurements were performed using a micrometer adapted to an Iroscope microscope and are given in millimeters. Terminology used for the species descriptions follows Sharkey and Wharton (1997) and Sharkey (2006) and for microsculpture of

surface we follow Eady (1968) and Sharkey and Wharton (1997). Data labels were transcribed to a database in the Program Paradox Version 4.5 and the information is presented in a standardized format organized by country and state or province. All photographs were taken using a Leica MZ 16 stereoscope equipped with JVC KY-F75 3CCD digital camera and were prepared using an Auto-Montage imaging system.

Specimens sources. For this revisión were borrowed the types of *C. apicipennis* Muesebeck, *C. divisus* (Cresson), *C. fenestratus* Viereck, *C. fulvescens* (Cresson), *C. medius* (Cresson), *C. muesebecki* Marsh, *C. nigriceps* (Cresson), *C. nigrithorax* Muesebeck, *C. pallens* (Cresson), *Microdus melanopleurus* Ashmead and *Orgilus rileyi* Ashmead. Paratypes, homotypes and additional specimens were provided from the following institutions: American Entomological Institute Collection, Florida (AEIC); American Museum of Natural History, New York (AMNH); Academy of Natural Sciences, Philadelphia, Pennsylvania (ANSP); California Academy of Sciences, San Francisco (CAS); Universidad Autónoma de Nuevo León, Nuevo León (CIBE-UANL); Canadian National Collection, Ottawa (CNC); Cornell University Insect Collections, New York (CUIC); Essig Museum of Entomology, University of California, California (EMEC); University of Wyoming, Wyoming (ESUW); Florida State Collection of Arthropods, Florida (FSCA); Hymenoptera Institute Collection, University of Kentucky, Kentucky (HIC); Instituto de Biología, Universidad Autónoma de México (IBUNAM); Fundación e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Argentina (IMLA); Illinois Natural History Survey, Illinois (INHS); Instituto Nacional de Investigaciones Forestales Agrícolas y Pecuarias, Guanajuato (INIFAP); University of Wisconsin, Wisconsin (IRCW); Kansas State University Collection, Kansas (KSUC); Museum of Comparative Zoology, Harvard University (MCZ); Michigan State University Collection, Michigan (MSUC); Museo de la Universidad de Costa Rica (MUCR); Ohio State University, Ohio (OSU); Texas A & M University, Texas (TAMU); Universidad Autónoma de Yucatán (UADY); The Bohart Museum of Entomology, University of California-Davis, California (UCDC); University of Colorado Museum, Colorado (UCMC); University of California-Riverside, California (UCR); Enns Entomology Museum, University of Missouri-Columbia, Missouri (UMRM); University of Minnesota-St. Paul, Minnesota (UMSP); Smithsonian National Museum of Natural History, Washington (USNM).

Descriptions and keys

Genus *Crassomicrodus* Ashmead, 1900

<http://species-id.net/wiki/Crassomicrodus>

Crassomicrodus Ashmead 1900. Type species *Microdus fulvescens* Cresson 1865, designated by Ashmead 1900 [Examined].

Epimicrodus Ashmead 1900. Type species *Microdus divisus* Cresson 1873, designated by Ashmead 1900 [Examined].

Crassomicrodus Ashmead = (*Epimicrodus* Ashmead) synonymized by Bradley 1916.

Diagnosis. *Crassomicrodus* species can be distinguished from other agathidines with the following combination of characters: simple tarsal claws, without basal lobes, apicolateral pegs of the hind tibia are hair-like, labio-maxillary complex not elongate; mandible with two teeth; and metasomal tergum 1 smooth.

Description. Head. Transverse or triangular; area between antennal sockets with a median pyramidal-shaped elevation or transverse; gena not bulging to distinctly bulging; labio-maxillary complex not elongate, mandible with two teeth, antenna with 25 to 43 flagellomeres.

Mesosoma. Pronotum surface smooth or punctuate; notauli from lacking to impressed; anterolateral edges of scutellum with or without a small acute projection; lateral scutellar depression from smooth to crenulate; dorsal surface of propodeum from rugulose to reticulate rugose; subalar lobe separated from mesopleuron by a wide or narrow groove; metapleuron from smooth to reticulate rugose; inner spur of hind tibia from 0.47 to 0.78 times longer than basitarsus; tarsal claw without basal lobe; outer apex of the hind tibia without flattened pegs; forewing vein R₁ 0.47–0.70 times longer than RS; crossvein *r* arising before or beyond middle of stigma. Metasoma. Metasomal median tergite 1 smooth; apical width 1.78–3.92 times longer than basal width; ovipositor sheaths and ovipositor variable in length; metasoma 1.00–1.42 times longer than mesosoma.

Key to the New World species of *Crassomicrodus* Ashmead

- 1 Head triangular in frontal view (Figs 2a, 4a, 5a, 6a, 10a, 12a, 14a); gena not bulging; area between antennal sockets with a median pyramidal-shaped elevation (Figs 2a, 4a, 5a, 6a, 10a, 12a, 14a); length of ventrolateral margin of clypeus similar to diameter of tentorial pit (Fig. 1a, 8a) 2
- Head transverse in frontal view (Figs 1a, 3a, 7a, 8a, 9a, 11a, 13a), if somewhat triangular then length of ventrolateral margin of clypeus longer than diameter of tentorial pit (Fig. 3a); gena bulging or at least slightly bulging (Figs 1a, 3a, 7a, 8a, 9a, 11a, 13a); area between antennal sockets variable in shape 10
- 2(1) Malar space at least 0.8 times as long as eye height (Figs 5a, 14a) 3
- Malar space at most 0.6 times as long as eye height (Figs 2a, 4a, 6a, 10a, 12a) 4
- 3(2) Scutellar sulcus with 3 or 4 carinae; second submarginal cell quadrangular; fore and middle legs black; body length 6.95–8.60 mm.. *C. divisus* (Cresson)
— Scutellar sulcus with 1 carina; second submarginal cell triangular; fore and middle legs yellowish-orange; body length 4.20–6.48 mm *C. pallens* (Cresson)
- 4(2) Forewing vein R₁ at most half the length of RS; head yellowish-orange (Fig. 14a) *C. pallens* (Cresson)

- Forewing vein R₁ at least 0.6 times longer than RS; head black (Fig. 4a) 5
- 5(4) Hind wing vein 1M less 1.0 times as long as 1r-m; body black; wings strongly infumate (Fig. 4e); body length at least 8.1 mm *C. costaricensis* sp. n.
- Hind wing vein 1M at least 1.4 times as long as 1r-m; body at least with some areas yellowish-orange or yellowish-red (Figs 2d, 6e, 12e), if body dark then body length less than 7.9 mm; wings at most slightly infumate (Fig. 10e)... 6
- 6(5) Head and mesosoma black (Figs 2d, 12e); posterior surface of antennal sockets at least slightly rugulose 7
- Head and mesosoma usually with some areas yellowish-orange or yellowish-red (Figs 6cde, 10cde), if entirely black then the posterior surface of antennal sockets smooth (Fig. 10b) 9
- 7(6) Subalar lobe separated from mesopleuron by a wide groove (Fig. 6c); body length 7.10–7.65 mm; 38–40 flagellomeres 8
- Subalar lobe separated from mesopleuron by a narrow groove (Fig. 2c); body length 5.20–5.50 mm; 31–33 flagellomeres *C. azteca* sp. n.
- 8(7) Hind legs black (Fig. 12e); wings hyaline; posterior area of antennal sockets rugulose (Fig. 12b)..... *C. oaxaquensis* sp. n.
- Hind femora yellowish-orange (Fig. 6e); wings slightly infumate; posterior area of antennal sockets rugose (Fig. 6b) *C. jalisciensis* sp. n.
- 9(6) Setae length on body surface slightly similar to setae length at base of mandible (6ac); posterior surface of antennal sockets rugose (Fig. 6b); frons deeply excavated; pronotum punctulate (Fig. 6c); propodeum reticulate rugulose..... *C. jalisciensis* sp. n.
- Setae length on body surface distinctly smaller than setae length at base of mandible (Figs 10 ac); posterior surface of antennal sockets smooth (Fig. 10b); frons excavated; pronotum smooth (Fig. 10c); propodeum rugose..... *C. nigriceps* (Cresson)
- 10(1) Area between antennal sockets with a median pyramidal-shaped elevation (Figs 3a, 7a) 11
- Area between antennal sockets at least weakly transverse or with a median elevation in trapezoidal shape (Figs 1a, 8a, 9a, 11 a, 13a) 14
- 11(10) Frons at least slightly excavated (Figs 3ab, 8ab); notauli impressed (Figs 3d, 8d); forewing M+CU pigmented over most its length; 34–41 flagellomeres.. 12
- Frons not excavated (Figs 7ab); notauli not impressed (Fig. 7d); forewing M+CU unpigmented over most its length; 25–28 flagellomeres..... *C. mariae* sp. n.
- 12(11) Length of ventrolateral margin of clypeus similar to diameter of tentorial pit (Fig. 8a) 13
- Length of ventrolateral margin of clypeus distinctly longer than diameter of tentorial pit (Fig. 3a) *C. clypealis* sp. n.

- 13(12) Inner spur of hind tibia distinctly longer than half of basitarsus length (0.60–0.72); gena bulging (Fig. 8a); lateral depression of scutellum smooth, only its ventral edge with small punctures *C. melanopleurus* Ashmead
- Inner spur of hind tibia less than half length of basitarsus (a few specimens with the spur at most reaching 0.54 times); gena distinctly bulging; lateral depression of scutellum rugose and foveolate *C. fulvescens* (Cresson)
- 14(10) Head and mesosoma black; anterolateral edges of scutellum lacking small acute projection 15
- Head and mesosoma at least with some areas yellowish-orange or yellowish-red (Figs 1acde); anterolateral edges of scutellum with small acute projection (Fig. 1df) *C. apicipennis* Muesebeck
- 15(14) Notauli not impressed over most of mesoscutum (Fig. 9c); metasoma black; setae at base of mandible similar in size to setae on rest of body surface (9ad); length of setae in scutellar disk 0.18 to 0.20 mm; ovipositor sheaths of female at least 1.83 mm in length *C. muesebecki* Marsh
- Notauli impressed over most of mesoscutum (Fig. 11c, 13d); metasoma yellowish-orange (Figs 11e, 13e); setae at base of mandible distinctly longer than setae on rest of body surface (11ad, 13ac); length of setae in scutellar disk less than 0.17 mm; ovipositor sheaths of female at most 0.22 mm in length ... 16
- 16(15) Area between antennal sockets with a median elevation in trapezoidal shape (Fig. 13a); gena distinctly bulging (Fig. 13a); malar space 0.54–0.59 times longer than eye height; 31–34 flagellomeres; body length 6.70–7.08 mm..... *C. olgae* sp. n.
- Area between antennal sockets with a median transverse elevation (Fig. 11a); gena bulging (Fig. 11a); malar space 0.38–0.47 times longer than eye height; 28–31 flagellomeres; body length 3.95–5.35 mm...*C. nigrithorax* Muesebeck

Species descriptions of *Crassomicrodus*

Crassomicrodus apicipennis Muesebeck, 1927

http://species-id.net/wiki/Crassomicrodus_apicipennis

Fig. 1a–f

Crassomicrodus apicipennis Muesebeck 1927: 18–19

Holotype female. Mount Hood, Oregon [USA]. Cat. No. 28695 (USNM).

Description female. Body. Length. 4.90–5.97 mm. Color (Fig. 1e). Integument black except yellowish-orange as follows, basal area of mandible, pronotum, mesonotum, subalar lobe, tegula, metasoma, femora, basal area of hind tibia, anterior and middle tibia and tarsomeres; mandible apex, basal area of hind tibia; tarsomeres blackish; wing veins dark brown; forewing infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Specimens range from black to yellowish-

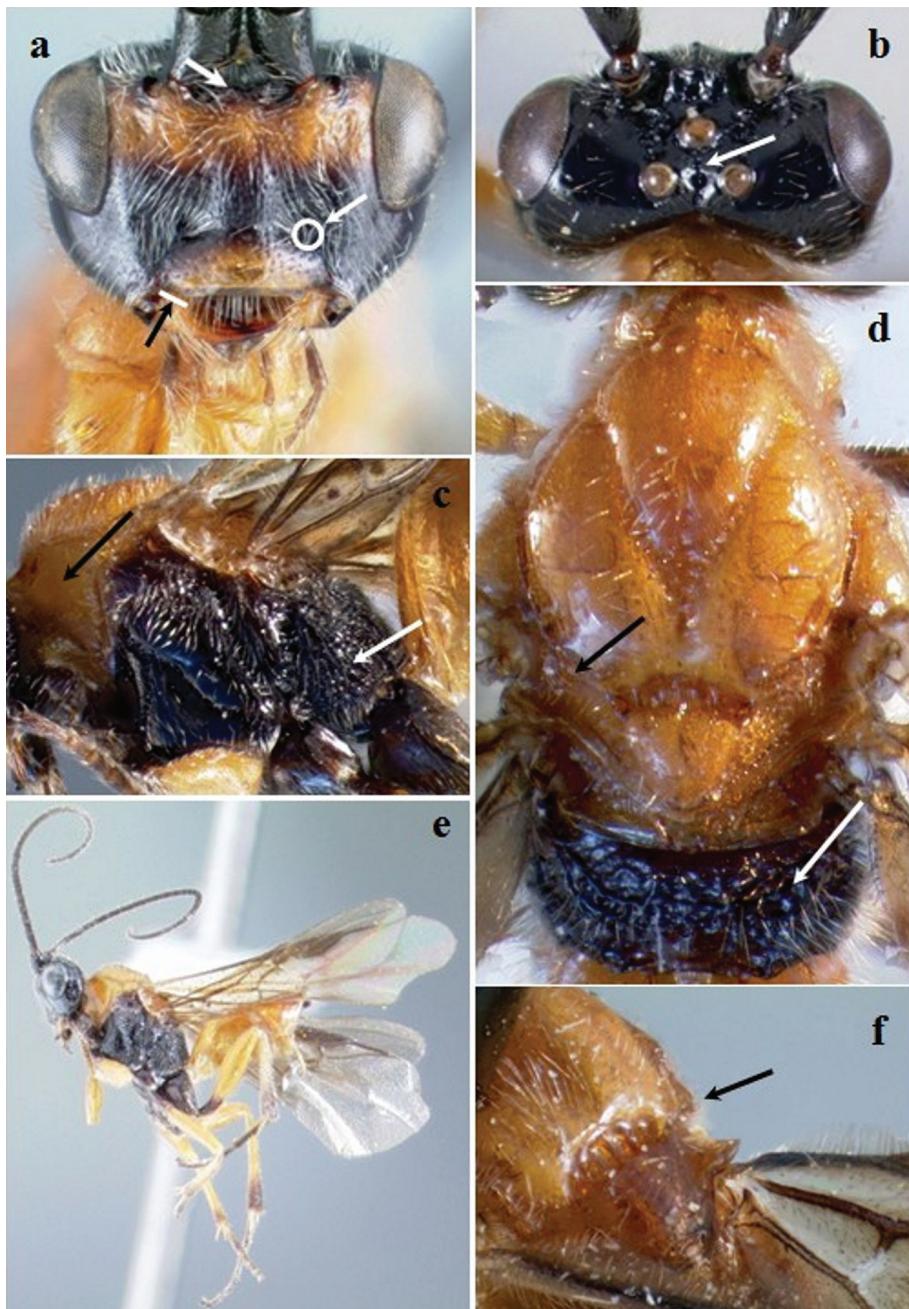


Figure 1. *Crassomicrodon apicipennis*. Female **a** anterior view of head, arrow indicates a median transverse elevation with two weakly defined lateral tubercles, ventrolateral margin of clypeus, and tentorial pit **b** dorsal view of head, arrow indicates groove between lateral ocelli with small foveolae **c** lateral view of mesosoma, arrows indicate pronotum and metapleuron **d** dorsal view of mesosoma, arrows indicate anterolateral edge of scutellum and propodeum **e** female habitus **f** dorsal view of scutellum, arrow indicates anterolateral edge of scutellum with a small acute projection.

orange on the head, propleuron, metanotum, propodeum, mesopleuron, metapleuron and hind coxa. Head (Fig. 1ab). Transverse in frontal view; face dorsomedially with weak longitudinal ridge in most specimens; eye height/width = 1.31–1.35; eye height 0.65–0.68× inter-ocular distance; area between antennal sockets with a median transverse elevation and two weakly defined tubercles; frons deeply excavated and rugulose with small foveolae; posterior surface of antennal sockets smooth; groove between lateral ocelli with small foveolae; median ocellus separated from lateral ocellus by groove with small foveolae; gena bulging; malar space 0.48–0.55× as long as eye height; clypeus (anterior view) 2.29–2.33× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 29–32 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 1c–f). Pronotum smooth; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum with a small acute projection; scutellar disc convex with sparse setae from 0.16 to 0.17 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression rugose and foveolate; carinae of central metanotal area forming a triangular cell; propodeum reticulate rugose, more pronounced on lateral margins; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly of shorter than subalar lobe; metapleuron rugose with reticulate-foveolae. Legs. Inner spur of middle tibia 0.76–0.83× length of basitarsus; inner spur of hind tibia 0.59–0.69× length of basitarsus; metabasitarsus 1.18–1.25× length of tarsomeres III, IV, and V combined; hind tibia 2.00–2.21× longer than basitarsus; hind femur length 3.38–4.12× its maximum width. Wings. Forewing length/width = 2.46–2.51; stigma 2.69–3.50× longer than maximum width; forewing vein R1 0.60–0.66× as long as vein RS; vein RS sinuate; vein r arising slightly before middle of stigma; second submarginal cell triangular, with petiole 0.07–0.13 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.37–3.52; hind wing vein 1M 1.65–1.80× longer than 1r-m; hind wing with 4–5 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.90–3.21× wider than basal width; minimum width of petiole 0.58–0.60× apical width; length of ovipositor sheath 0.17–0.30 mm.

Male. Similar to female.

Host. Unknown.

Distribution. Canada, Mexico, and USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median transverse elevation, anterolateral edges of scutellum with a small acute projection, groove between lateral ocelli with small foveolae, and head and mesosoma black with some areas yellowish-orange.

Remark. This species is near to *C. nigrithorax*, but differs in that *C. nigrithorax* has the mesosoma black; anterolateral edges of scutellum lacking small acute projection; eye height 0.69–0.70× inter-ocular distance; malar space 0.38–0.47× longer than eye height; inner spur of middle tibia 0.89–0.95× length of basitarsus; and scutellar disc convex with sparse setae from 0.14 to 0.15 mm in length.

Material examined. Holotype ♀: USA, Oregon: Mt. Hood. Collection Ashmead (USNM). Allotype ♂: same data as type (USNM). Homotype ♀: USA, Iowa: Iowa Co.,

10/VIII/1934, Jaques H.E. (CNC). *Other specimens examined.* - **CANADA, Alberta:** Alta. 1 ♀; Scandia Alta., 1 ♀ 26/VII/1956, Peck O. (CNC). **British Columbia:** Hedley, Nickel Plate City, 1 ♀ 17/VIII/1953, 1524 m, Martin J.E.H.; Kamloops 1 ♂ 9/VII/1939, Spencer G.J.; Richter Pass, Osoyoos 1 ♀ 28/VI/1959, Kelton L.A. (CNC). **Manitoba:** Aweme, N Criddle, 1 ♀ 9/VII/1924 (CNC). **MEXICO, Durango:** 5 mi. W Durango 1 ♂ 24/VI/1964, Howden H.F. (HIC). **Sonora:** Nogales 1 ♂ 4/IX/1965, Michelbacher A.E. (EMEC); **Tamaulipas:** Santa Teresa 1 ♂ 15/V/1952, Cazier M., W. Gertsch & R. Schrammel (AMNH). **USA: Iowa Co.,** 1 ♀ 19/VI/1935, Huizinga H. (USNM). **Arizona:** Springerville, 1 ♂ 26/VII/1956, Butler-Gerhardt (USNM); 9 km SE Camp Verde, Clear Creek, Yavapai Co., 1 ♂ 11/IX/1986, Parker F. & T. Griswold (CNC). **Colorado:** 1 ♂; Boulder Canyon, 1 ♀ 8/VIII/1960, 2377 m, Dreisbach R.K. (USNM); 3 mi. NW Wiggins, Morgan Co., 1 ♂ 8/VIII/1974, Favreau M. & T.M.; Pagosa Springs, 1 ♀, 1 ♂ 22–24/VI/1919, 2195 m, 37.16 N 107.0 W (AMNH); Craig, 1 ♂ 25/VI/1949, Bryant L. (CAS); Fort Morgan, 1 ♂ 5/VIII/1960, Dreisbach R.K. ; Limon, 1 ♂ 16/VIII/1949, Dreisbach R.R. & R.K. Shwab (MSUC); Limon, 1 ♂ 16/VIII/1949, Dreisbach R.R. & R.K. Shwab (AEIC); Nunn, 1 ♀ 7/VI/1976, Lavigne R. (ESUW); Prowers Co., 1 ♀ 5/VI/1962, Marston N. (KSUC); Running Creek Field Sta. Elbert Co. T9S, R65W, Sec 35 NE nativo, 2 ♀ 2118 m, Brown F.M. (UCMC). **Kansas:** Manhattan, 1 ♀, 1 ♂ 16/VII/1950, Evans H.E.; Manhattan, 1 ♂ 24/V/1935, Wilbur D.A. (KSUC); Sitka, Clark Co., 1 ♀ 12/VI/1960, Eickwort G.C. (MSUC). **Minnesota:** Albert Lea, Freeborn Co., 1 ♀, 1 ♂ 11/VI/1961, Levi H. (MCZ); Browns Valley, 1 ♂ 4/VIII/1935, Denning D.G.; Lincoln Co., 1 ♂ 4/VI/1938, Mickel C.E.; Ortonville: 1 ♂ 5/VIII/1935, Deggy R.H.; 6 ♂ 5/VIII/1935, Denning D.G.; Polk Co., 1 ♀ 16/VIII/1936, Daggy R.H.; Yellow Medicine Co., 1 ♂ 13/VIII/1936, Mickel C.E. (UMSP). **Missouri:** Diehlstadt, 1 ♂ 5/VIII/1938, Wingo C. (UMRM); Columbia, 1 ♂ 7/VIII/1958, Blickenstaff C.C. (USNM). **Nebraska:** Valentine Refuge, 1 ♂ 7/VI/1972, Townes H. & M. Townes (AEIC); 1.5 mi. N Mullen (Middle Loup River), Hooker Co., 1 ♀ 2–4/VII/1983, Grissell & Menke (HIC); Thomas Co., 1 ♂ 21/VIII/1951, Dreisbach R.R. (MSUC); Halsey: 1 ♂ 12/VIII/1925, Dawson R.W.; 1 ♂ 15/VIII/1925, Dawson R.W.; McCool, 1 ♀ 22/VIII/1940, Milliron H.E. (UMSP); Morril Co., 1 ♂ 22/VIII/1951, Dreisbach R.R. (USNM). **Oklahoma:** Lake Carl Etling, Black Mesa State Park, 25 mi. by road NW Boise City, Cimarron Co., 1 ♂ 14/VIII/1967, Leech H. (CAS); Pond Creek, Grant Co., 2 ♀ 11/VI/1960, Eickwort G.C. (MSUC). **Texas:** Spring, 1 ♂ 21/VI/1947, Rockefeller D. (AMNH); 30 mi. N Uvalde, Uvalde Co., 1 ♀ 21/VI/1983, Pulawski W.J. (CAS); East Hwy. side of Road way park, 7 mi. S Beeville, 1 ♀ 2/VI/1964, Hull F.M. & M.C. (CNC); Sam Houston, Bexar Co., 1 ♀ 31/III/1953, Adelson B.J. (EMEC); 3 mi. W Estelline, Hall Co., 1 ♀ 3/VI/1979, Michener C.D. (HIC); Alice: 1 ♂ 17/VII/1954, Dreisbach R.R. (MSUC); 1 ♂ 17/VII/1954, Dreisbach R.R. (USNM); Bangs, 1 ♀ 6/VIII/1938 (USNM); Bentsen Rio Grande Valley State Park. Hidalgo Co.: 1 ♀ 11/VIII/1983, Bars M. Kaul (CNC); 1 ♂ 10/VI/1982, 1 ♂ 10/VIII/1983, 1 ♂ 11/VI/1982, 1 ♂ 15/VIII/1983, 1 ♂ 16/VIII/1983, 1 ♂ 25/V/1977, 1 ♂; 27/VI/1983, 1 ♂ 28/VI/1983, 3 ♀ 4/VI/1982, 1 ♂ 9/VI/1982, Porter C. (FSCA); Bentsen Rio Grande Valley State Park. Nr. Mission, Hidalgo Co.: 1 ♀,

1 ♂ 13/VI/1983, 1 ♀, 1 ♂ 20/VI/1983, 1 ♂ 22/III/1984, 1 ♂ 26/VII/1984, 1 ♀ 30/VIII/1983, 4 ♀, 2 ♂; 4/VIII/1983, Porter C. (FSCA); Dumas, Moore Co., 3 ♂ y 1 ♂ 14/VI/1960, Fischer R.L. (MSUC); Brownsville, 1 ♂ 6/VII/1895; Kerrville, 1 ♀ 12/IV/1907, Pratt F.C.; College State, 2 ♂ 29/III/1954, Lewis W.J. (USNM). **Utah:** Goblin Vly, sand dunes, Emery Co., 1 ♀ 20/VI/1980, Parker F.D.; Wild Horse cr. W Goblin Vly., Emery Co., 1 ♀ 26/VII/1983, 1463 m, Parker F. & T. Griswold (CNC). Bonanza, Uintah Co., 1 ♀ 27/VI/1978, Bohart G. (UCMC). **Wyoming:** Glendo, 1 ♂ 24/VI/1960, Lavigne R.J. (USNM).

***Crassomicrodus azteca* Figueroa, Romero & Sharkey, sp. n.**

urn:lsid:zoobank.org:act:D1F7CD97-570A-42DB-B164-312E6869C770

http://species-id.net/wiki/Crassomicrodus_azteca

Fig. 2a–d

Description female. Body. Length. 5.20–5.50 mm. Color (Fig. 2d). Integument black except yellowish-orange as follows, medial area of mandible, tegula, femora, anterior and middle tibiae and tarsomeres, and metasoma; eyes silver; ocelli translucent honey yellow; wing veins dark brown; forewing slightly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. In some specimens the first metasomal tergite blackish. Head (Fig. 2ab). Triangular in frontal view; face with weak longitudinal ridge dorsomedially; eye height/width = 1.43–1.45; eye height 0.59–0.63× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation; frons excavated with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior surface of antennal sockets slightly rugulose; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.60–0.63× as long as eye height; clypeus 2.27–2.35× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 31–33 flagellomeres; setae at base of mandible slightly longer than setae on rest of body surface. Mesosoma (Fig. 2bcd). Pronotum punctulate with setae; lateral pronotal margins with a shallow, crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.13 to 0.14 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth, sometimes with microfoveolate grooves in its ventral and dorsal margins; carinae of central metanotal area almost circular shaped, sometimes triangular; propodeum reticulate rugose with abundant setae in its lateral areas; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly of smaller size than the subalar lobe; metapleuron reticulate rugulose in its ventral half and smooth in its dorsal half. Legs. Inner spur of middle tibia 0.65–0.70× length of basitarsus; inner spur of hind tibia 0.58–0.64× length of basitarsus; metabasitarsus 1.05–1.16× length of tarsomeres III, IV, and V combined; hind tibia 2.41–2.67× longer than basitarsus; hind femur length 3.50–4.00× its maximum width. Wings. Forewing length/width = 2.50–2.55; stigma 3.00–3.23× longer than maximum width; forewing vein R₁ 0.61–0.68× as



Figure 2. *Crassomicrodon azteca* sp. n. Female **a** anterior view of head, arrow indicates a median pyramidal-shaped elevation **b** dorsal view of head and mesosoma, arrow indicates posterior surface of antennal sockets slightly rugulose **c** lateral view of mesosoma, arrow indicates subalar lobe separated from mesopleuron by narrow groove **d** female habitus, arrow indicates triangular-shaped second submarginal cell.

long as vein RS; vein RS slightly straight; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.07–0.12 mm long; vein M+CU weakly pigmented in 0.75 of its basal length; hind wing length/width = 3.37–3.38; hind wing vein 1M 1.44–1.70× longer than 1r-m; hind wing with 4–5 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.46–3.71× wider than basal width; minimum width of petiole 0.53–0.59× apical width; length of ovipositor sheath 0.13–0.28 mm.

Male. Similar to female, but the posterior surface of antennal sockets smooth.

Host. *Copitarsia* sp. (Lepidoptera: Noctuidae) in *Brassica oleracea* L. (cauliflower).

Distribution. Mexico.

Diagnosis. Distinguished from other *Crassomicrodus* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, malar space 0.60–0.63× as long as eye height, setae at base of mandible slightly longer than setae on rest of body surface, body length 5.20–5.50 mm, head and mesosoma black, and forewing slightly infumate.

Remarks. This species is similar to *C. nigrithorax*, but differs in that *C. nigrithorax* has gena bulging; area between antennal sockets with a median transverse elevation; groove between lateral ocelli with small foveolae; and malar space 0.38–0.47× longer than eye height.

Etymology. The specific epithet is a noun in apposition to *Crassomicrodus*, which is reference to some of the indigenous people of Mexico.

Material examined. Holotype ♀: MEXICO, México: Chapingo, 31/VII/1967, J.L. Carrillo Sánchez. *Copitarsia* sp. Allotype ♂: same data as holotype. Holotype and Allotype deposited in Instituto de Investigaciones Agropecuarias y Forestales, Universidad Michoacana de San Nicolás de Hidalgo, Tarímbaro, Michoacán, México (IIAF-UMSNH). Paratypes: **MEXICO, Guanajuato:** 10 mi. NW Leon, 1 ♂ 19/VIII/1954, 2042 m, Chillcott J.G. (CNC); Guanajuato, 1 ♀ 15/VIII/1953, Vaurie C. & P. Vaurie (AMNH). **Hidalgo:** Pachuca, Junction Rt. 85, 2 ♀ 24/IV/1965, 2438–2591 m, Weems H.V. Jr. (FSCA). **Jalisco:** Lagos de Moreno, 1 ♀ 12/VIII/1954, 1920 m, Dreisbach R.R. (USNM); Rancho La Quinta Teocaltiche, 1 ♂ 25/VIII/1979, 1707 m, Villegas B. (UCDC). **México state:** Chapingo: 1 ♂ 1950, F. Pacheco M. (USNM); 2 ♀ 1/VIII/1967, 7/VIII/1967, J.L. Carrillo Sánchez. *Copitarsia* sp., (IIAF); Chimalhuacán, 1 ♂ 28/VIII/1967, J.L. Carrillo Sánchez, *Copitarsia* sp. (IIAF); Pirámides de Teotihuacan, 3 ♀ 7/VII/1951, Hurd P.D. (USNM); Texcoco, 1 ♂ 12/VIII/1954, 2134 m, Chillcott J.G. (CNC). **Nuevo Leon:** 32 km W Linares, San Pedro Iturbide, 1 ♂, 2 ♀ 5/X/1962, Townes H. & M. Townes (AEIC). **Puebla:** 14 km NE Cañada Morelos, 1 ♂ 10/VII/1974, Chemsak J., E.G. Linsley & J. Linsley (EMEC). **Zacatecas:** 15 km E Sombrerete, 1 ♂ 30/VII/1951, Hurd P.D. (USNM); 5 km NE Huejucar, 1 ♀ 13/IX/1984, Pulawski W.J., 22.21 N 103.13 W (CAS); 5 mi. N Zacatecas, 1 ♀ 19/IX/1970, Bohart G.E. & R.M. Bohart (CNC); 9 mi. SE Fresnillo, 1 ♂ 7–14/VIII/1954, Linsley E.G., J.W. MacSwain & R.F. Smith (EMEC); Fresnillo, 1 ♂ 15/VIII/1947, 2134 m, Rockefeller D. (AMNH).

Crassomicrodus clypealis Figueroa, Sharkey & Romero, sp. n.

urn:lsid:zoobank.org:act:1D3A68FB-656B-44F1-BC9E-B7E343BF4A90

http://species-id.net/wiki/Crassomicrodus_clypealis

Fig. 3a–e

Description female. Body. Length. 7.38–7.50 mm. Color (Fig. 3c). Integument yellowish-orange except black as follows, mandible apex, head, antenna, propleuron, mesopleuron, metapleuron, metanotum, propodeum, coxa and trochanters; ocelli translucent honey yellow; apical area of hind tibia, middle and hind tarsomeres black-

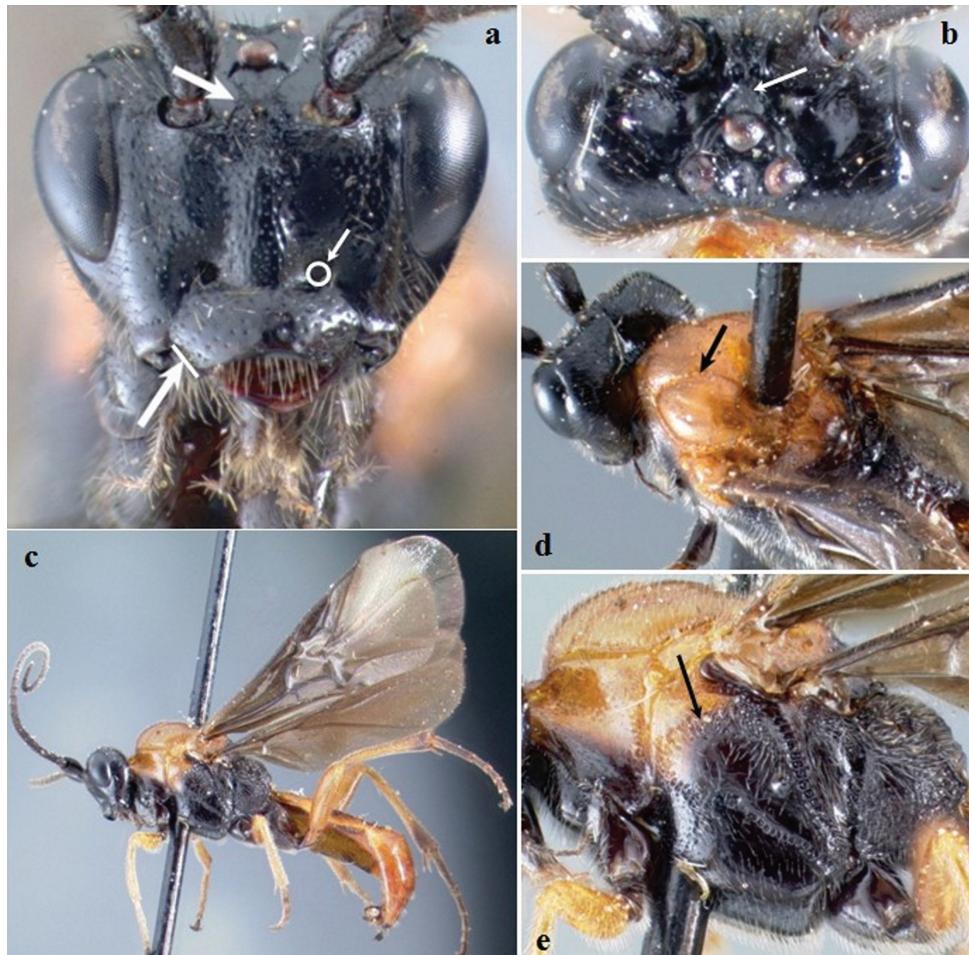


Figure 3. *Crassomicrodon clypealis* sp. n. Female **a** anterior view of head, arrows indicate a median pyramidal-shaped elevation with two weakly defined tubercles, ventrolateral margin of clypeus, and tentorial pit **b** dorsal view of head, arrow indicates frons deeply excavated with a pair of microfoveolate grooves **c** female habitus **d** dorsal view of mesosoma, arrows indicate impressed notauli **e** lateral view of mesosoma, arrow indicates subalar lobe separated from mesopleuron by narrow groove.

ish; wing veins dark brown; forewing strongly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 3ab). Transverse in frontal view; face with weak longitudinal ridge dorsomedially; eye height/width = 1.38–1.43; eye height 0.68–0.70× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles; frons deeply excavated with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena slightly bulging; malar space 0.46–0.48× as long as eye height; clypeus 2.40–2.42× wider than high; length of ventrolateral margin of clypeus distinctly longer than diameter of ten-

torial pit; antenna with 38–39 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 3cde). Pronotum smooth; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.07 to 0.08 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression with punctures and foveolae; carinae of central metanotal area in triangular shaped; propodeum reticulate rugose; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; metapleuron reticulate rugulose or reticulate punctures. Legs. Inner spur of middle tibia 0.69–0.72× length of basitarsus; inner spur of hind tibia 0.55–0.58× length of basitarsus; metabasitarsus 1.15–1.23× length of tarsomeres III, IV, and V combined; hind tibia 2.25–2.30× longer than basitarsus; hind femur length 3.56–3.78× its maximum width. Wings. Forewing length/width = 2.42–2.50; stigma 2.88–3.00× longer than maximum width; forewing vein R₁ 0.58–0.62× as long as vein RS; vein RS sinuate; vein r arising slightly before middle of stigma; second submarginal cell triangular, with petiole 0.06–0.09 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 2.91–3.15; hind wing vein 1M 1.35–1.43× longer than 1r-m; hind wing with 6–7 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.82–3.14× wider than basal width; minimum width of petiole 0.56–0.64× apical width; length of ovipositor sheath 0.35–0.37 mm.

Male. Similar to female, except antenna with 36 to 41 flagellomeres and pronotum may be slightly melanic.

Host. Unknown.

Distribution. USA.

Diagnosis. Distinguished from other *Crassomicrodus* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, length of ventrolateral margin of clypeus distinctly longer than diameter of tentorial pit, and gena slightly bulging.

Remarks. This species is near to male of *C. fulvescens*, but differs in that *C. fulvescens* has the length of ventrolateral margin of clypeus similar to the diameter of the tentorial pit; gena distinctly bulging; and forewing infumate with a large hyaline spot in first submarginal cell.

Etymology. Named “clypealis” to emphasize that the ventral margin of the clypeus is longer than the diameter of each tentorial pit.

Material examined. Holotype ♀: USA, Colorado: nr. Roggen, 4/IX/1972, Lanham U.N. & C.C. Lanham. Allotype ♂: Roggen, 29/VIII/1930, Rodeck H.G.. Holotype and Allotype deposited in UCMC. Paratypes: 1 ♂; USA, Colorado: 3 mi. NW Roggen, Weld Co., 4/IX/1974, Lanham U.N. (CNC); 1 ♀ same data as holotype; 1 ♂ same data as allotype (UCMC); Sandhills N of Roggen Weld Co.: 1 ♂ 12/IX/1934, Rodeck H.G. (HIC); 1 ♂ 12/IX/1934, Rodeck H.G. (USNM); 2 ♂ 12/IX/1934, Rodeck H.G.; 1 ♂ 16/VIII/1990, Bowers M.D. (UCMC). **Kansas:** Ness Co., 1 ♂ 7/IX/1965, Blocker H.D. (KSUC). **Nebraska:** Halsey: 1 ♀, 1 ♂ 11/VIII/1925, 1 ♂ 12/VIII/1925, 1 ♂ 15/VIII/1925, Dawson R.W. (UMSP).

***Crassomicrodon costaricensis* Figueroa, Sharkey & Romero, sp. n.**

urn:lsid:zoobank.org:act:B9743BFC-4824-494E-BD02-B19BCBF66134

http://species-id.net/wiki/Crassomicrodon_costaricensis

Fig. 4a–e

Description female. Body. Length. 8.10–8.70 mm. Color (Fig. 4e). Integument black except eye silver, ocelli translucent yellow (Fig. 1d); medial area of mandible yellow-reddish; metasoma dark brown; forewing strongly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 4ab). Triangular in frontal view; face with longitudinal ridge dorsomedially; eye height/width = 1.41–1.42; eye height (lateral view) 0.75–0.77× inter-ocular distance (anterior view); area between antennal sockets with a median pyramidal-shaped elevation; frons excavated with a little longitudinal groove; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.47–0.51× as long as eye height; clypeus 2.13–2.32× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 41 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 4cde). Pronotum punctulate with setae; lateral pronotal margins with a shallow, crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.12 to 0.14 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth with punctures or rugosities in its ventral border; carinae of central metanotal area almost circular shaped; propodeum reticulate rugulose, more pronounced on lateral margins; subalar lobe separated from mesopleuron by wide rugulose groove, width almost of similar size to subalar lobe; metapleuron smooth, only reticulate rugulose one-fourth of ventral area. Legs. Inner spur of middle tibia 0.76–0.89× length of basitarsus; inner spur of hind tibia 0.62–0.72× length of basitarsus; metabasitarsus 1.02–1.18× length of tarsomeres III, IV, and V combined; hind tibia 2.04–2.38× longer than basitarsus; hind femur length 4.07–4.17× its maximum width. Wings. Forewing length/width = 2.58; stigma 4.54–5.00× longer than maximum width; forewing vein R₁ 0.60–0.64× as long as vein RS; vein RS sinuate; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.13–0.20 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.48–3.65; hind wing vein 1M 1.01–1.08× longer than 1r-m; hind wing with 6–7 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.86–2.91× wider than basal width; minimum width of petiole 0.49–0.59× apical width; length of ovipositor sheath 0.28–0.41 mm.

Male. Unknown.**Host.** Unknown.**Distribution.** Costa Rica and El Salvador.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, eye height 0.75–0.77× inter-ocular distance, antenna with 41 flagellomeres,



Figure 4. *Crassomicrodon costaricensis* sp. n. Female **a** anterior view of head, arrow indicates a median pyramidal-shaped elevation **b** dorsal view of head **c** lateral view of mesosoma, arrow indicates subalar lobe separated from mesopleuron by wide groove **d** dorsal view of mesosoma **e** female habitus.

body length 8.10 to 8.70 mm, hind wing vein 1M 1.01–1.08× longer than 1r-m, head and mesosoma black, metasoma dark brown, and wings strongly infumate.

Remark. Specimens from Costa Rica are homogeneous in their measurements, but the specimen from El Salvador differs significantly. Nonetheless it is considered conspecific here due to similarity in other characters. More specimens and molecular data should easily test this hypothesis in the future.

Etymology. The specific name is a noun in apposition to *Crassomicrodon* and is chosen because of the locality where the holotype was collected, Costa Rica.

Material examined. Holotype ♀: COSTA RICA, Guanacaste: Barra Honda NP, VI/1988, 200 m., Gauld & Mitchel, deposited in MUCR. Paratypes: 1 ♀ same data as holotype (MUCR); **Guanacaste:** Scrub forest (7yr), Open site, 1 ♀ 22/VI/1985, Gauld & Janzen, 300 m. (HIC). **EL SALVADOR, [La Unión]:** Vol. Conchagua, 1 ♀; 27–29/V/1958, Cartwright O.L. (MUCR).

***Crassomicrodon divisus* (Cresson, 1873)**

http://species-id.net/wiki/Crassomicrodon_divisus

Fig. 5a–e

Crassomicrodon divisus (Cresson): Bradley 1916: 139–140; Muesebeck 1927: 21.

Microdon divisus Cresson 1873: 52 [Examined].

Orgilus rileyi Ashmead 1888: 640 [Examined].

Epimicrodon divisus Ashmead 1900: 129.

Holotype female. Illinois [USA]. No. 1726.1 (ANSP).

Description female. Body. Length. 6.95–8.60 mm. Color (Fig. 5e). Integument black except reddish yellow as follows, pronotum, mesonotum, subalar lobe, tegulae, hind femora, and metasoma; mandible and wing veins dark brown; eye silver or blackish; ocelli translucent yellow; forewing infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Rarely, central area of mesopleuron or hind coxa or propodeum and metapleuron reddish yellow. Head (Fig. 5ab). Triangular in frontal view; face with longitudinal ridge dorsomedially; eye height/width = 1.38–1.40; eye height 0.57–0.58× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation, sometimes with two weakly defined tubercles; frons excavated with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.78–0.83× as long as eye height; clypeus 1.85–1.95× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 32–35 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 5cde). Pronotum reticulate rugulose, sometimes strigose; lateral pronotal margins with a shallow, crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc slightly convex with sparse setae from 0.10 to 0.11 mm in length; scutellar disc sloped posteriorly and flattened; lateral scutellar depression reticulate rugulose and foveolae; carinae of central metanotal area forming a triangular cell; propodeum reticulate rugose; subalar lobe separated from mesopleuron by wide rugose groove with reticulate foveolae, width almost of similar size to subalar lobe; metapleuron reticulate-rugose. Legs. Inner spur of middle tibia 0.67–0.71× length of basitarsus; inner spur of hind tibia 0.59–0.68× length of basitarsus; metabasitarsus 1.21–1.29× length of tarsomeres III, IV, and V combined; hind tibia 2.17–2.27× longer than basitarsus; hind femur length 3.91–4.22× its maximum width. Wings. Forewing length/width = 2.56–2.60; stigma 3.27–3.70× longer than maximum width; forewing vein R₁ 0.59–0.64× as long as vein RS; vein RS not sinuate; vein r arising before middle of stigma; second submarginal cell quadrangular, with petiole 0.12–0.21 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.25–3.51; hind wing vein 1M 1.52–1.60× longer than 1r-m; hind wing with 6–7 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.10–3.13× wider than basal width; minimum width of petiole 0.61–0.63× apical width; length of ovipositor sheath 0.33–0.41 mm.



Figure 5. *Crassomicrodon divisus*. Female **a** anterior view of head, arrow indicates a median pyramidal-shaped elevation **b** dorsal view of head **c**, dorsal view of mesosoma **d** lateral view of mesosoma, arrow indicates subalar lobe separated from mesopleuron by wide groove **e**, female habitus.

Male. Unknown.

Host. Unknown.

Distribution. Canada, Mexico, and USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, malar space $0.78\text{--}0.83\times$ as long as eye height, scutellar disc sloped posteriorly and flattened, head black and mesosoma mostly black with some areas reddish yellow.

Remarks. Males of *C. divisus* were not found in this revision, although Muesebeck (1927) recorded them. We carefully examined long series from diverse localities to find them but without success. Therefore we speculate that males of this species are absent or very rare.

Material examined. Type: *M. divisus* 1 ♀, Ill. (ANSP), *O. rileyi* 1 ♀ (USNM). Homotype: 1 ♀, **Texas:** Davis Ranch, NW Blanco Co., 22/IV/1959, Mason W.R.M. (CNC). Other specimens examined.- 1 ♀ (AMNH). 9 ♀ (INHS). 1 ♀ (MSUC). 1 ♀ (USNM). 1 ♀; 19/VI/1898 (AEIC). 1 ♀; VII/1917 (USNM). 1 ♀; **CANADA, Ontario:** Constance Bay, Carleton Co., 24–31/VI/1977, Sanborne M. (CNC). 1 ♀; Ottawa, 3/X/1912, Beaulne J.I. (CNC). 1 ♀; Cana (USNM). 1 ♀; **MEXICO, Durango:** 10 miles N Durango, 12/VII/1954, McSwain (EMEC). 1 ♀; **Guanajuato:** San Miguel Allende, 12/VIII/1953, Vaurie C. & P. Vaurie (AMNH). 1 ♀; **Jalisco:** 4 miles W Mazamitla, 16/X/1950, 2073 m., Smith Ray F. (AMNH). 1 ♀; Guadalajara, 17/IX/1957, Dreisbach R. & K. Dreisbach (MSUC). 1 ♀; Guadalajara, 17–20/VII/1965, Evans H.E. (MCZ). 1 ♀; **Nuevo León:** 4 miles W El Cercado, 6/VI/1951, Hurd P.D. (EMEC). 1 ♀; 9 miles W Iturbide, 3/VII/1974, Clark, Murray, Ashe, Schaffner (TAMU). 1 ♀; **Puebla:** Puebla, 3/VII/1952, Gilbert E.E. & C.D. MacNeil (EMEC). 1 ♀; **Zacatecas:** Trancosa, 3/VII/1961, Dreisbach R. & K. Dreisbach (MSUC). 4 ♀; **USA, Colo.** (USNM). 1 ♀; Detroit, 7/VI (USNM). 1 ♀; **Arizona:** Canelo, 10/VII/1957, Butler G.D. (HIC). 1 ♀; **Illinois:** Algonquin, 30/VIII/94–99 (INHS). 1 ♀; Algonquin, Nason (INHS). 1 ♀; Grand Tower, 28/VII/1905 (INHS). 1 ♀; Illinois, VIII/1899 (MCZ). 1 ♀; Meredosia, 20/VIII/1917 (INHS). 1 ♀; **Iowa:** Ames, 25/V/1925 (UCDC). 1 ♀; Sioux City, Ainslie C.N. (USNM). 1 ♀; **Kansas:** Baldwin, V/190?, Bridwell J.C. (USNM). 1 ♀; Baldwin, VIII, Bridwell J.C. (UCDC). 1 ♀; Douglas Co. (MCZ). 1 ♀; Manhattan, 10/VI/1950, Evans H.E. (KSUC). 1 ♀; Manhattan, 10/VII/1949, Kring James B. (KSUC). 1 ♀; Onaga, 9/VII/1922, Crevecoeur (KSUC). 1 ♀; Riley Co., 16/VI, Smith R.C. (KSUC). 1 ♀; Riley Co., 9/VII, Popenoe (KSUC). 1 ♀; Riley Co., V, Marlatt (KSUC). 1 ♀; **Kentucky:** Lexington (USNM). 1 ♀; **Michigan:** White Pigeon, St. Joseph Co., 14/VI/1959, Fischer R.L. (MSUC). 1 ♀; **Minnesota:** Lake Pepin E Frontenac, 24/V/1941, Sun V.P. (UMSP). 1 ♀; Ortonville, 5/VIII/1935, Denning D.G. (UMSP). 1 ♀; Olmsted Co., VIII/1896, Linslie C.N. (USNM). 1 ♀; **Missouri:** Columbia, Boone Co., 16/VIII/1968, Parker F.D., malaise trap (HIC). 1 ♀; Clayton, 3/VI/1939, Pickel B.H. (AEIC). 1 ♀; Columbia, 1/VIII/1968, Parker F.D. malaise trap (UCDC). 1 ♀; Columbia, 10/VIII/1967, Parker F.D. malaise trap (USNM). 1 ♀; Columbia, 14/IX/1939, Crajo W.S. (UMRM). 1 ♀; Columbia, 17/VIII/1966, Huber S.F. (USNM). 1 ♀; Columbia, 2/VIII/1968, Parker F.D. malaise trap (UCDC). 1 ♀; Columbia, 23/VIII/1967, Parker F.D. malaise trap (USNM). 2 ♀; Columbia, 26/VIII/1967, Parker F.D. malaise trap (USNM). 1 ♀; Columbia, 10/VII/1967, Parker F.D., malaise trap (USNM). 1 ♀; Columbia, 22/VII/1967, Parker F.D., malaise trap (USNM). 1 ♀; Columbia, 20/IX/1967, Parker F.D., malaise trap (USNM). 1 ♀; Columbia, 6/IX/1967, Parker F.D. malaise trap (USNM). 1 ♀; Columbia, 7/IX/1966, Huber S.F. (USNM). 1 ♀; Columbia, 16/VIII/1966, Huber S.F. (USNM). 2 ♀; Columbia, Boone Co., 22/VIII/1968, Parker F.D. malaise trap (USNM). 2 ♀; Jefferson City, 6/VII/1941, Adams C.F. (USNM). 1 ♀; Sapp, 10/VII/1954 (UMRM). 1 ♀; **Nebraska:** Maxwell, 25/VII/1967 (IRCW). 1 ♀; **New Jersey:** Camden, 1892? (MSUC). 1 ♀; Trenton, Abbatt (MCZ). 1 ♀; **New York:** Boston, 1/VIII/1909, M.C.V. (UCDC). 1 ♀; Lancaster, 10/VIII/1891, E.P.V.

(CAS). 1 ♀; **Ohio**: Champaign Co., 23/VII/1941, Guillaspy J.F. (OSU). 1 ♀; Champaign Co., 23/VII/1941, Guillaspy J.F. (OSU). 1 ♀; Dayton O., VIII/1927, Basker C.A. (OSU). 1 ♀; W Jefferson, Franklin Co. (USNM). 1 ♀; **South Dakota**: Vermillion, 30/VI/1960, Walgenbach D.D. (IRCW). 1 ♀; Davis Ranch, NW Blanco Co., 22/IV/1959, Mason W.R.M. (CNC). 1 ♀; Edna, 19/VII/1908, Mitchell J.D. (USNM). 1 ♀; **Texas**: Sonora, Sutton Co., 19/V/1973, Menke & Miller (USNM). 1 ♀; **Virginia?**: Va. (USNM). 1 ♀; **Wisconsin**: Columbia Co., 23/VII/1961, Carney Don (IRCW). 1 ♀; Dane Co., VIII/1899 (AEIC). 1 ♀; Dane Co., 10/VIII/1899 (AEIC). 1 ♀; St. Croix Co., 2/VIII/1916, McNeel W. (AEIC).

***Crassomicrodus fulvescens* (Cresson, 1865)**

http://species-id.net/wiki/Crassomicrodus_fulvescens

Microdus fulvescens Cresson 1865: 297 [Examined].

Microdus medius Cresson 1865: 298 [Examined].

Holotype female. Col. No. 1727.1 (ANSP).

This species was recently investigated by Figueroa et al. (2008), who found that *C. medius*, based on males only, is conspecific with *C. fulvescens*, which was based entirely on females.

***Crassomicrodus jalisciensis* Figueroa, Romero & Sharkey, sp. n.**

urn:lsid:zoobank.org:act:E141B22C-E1E6-458A-A817-9550A6ED2FDA

http://species-id.net/wiki/Crassomicrodus_jalisciensis

Fig. 6a–e

Description female. Body. Length. 7.35–7.50 mm. Color (Fig. 6e). Integument yellowish orange except black as follows, face, frons, gena temple, vertex, antenna, mandible apex, propleuron, ventral area of mesopleuron, apical area of hind tibia and tarsomeres; eye silver or blackish, ocelli translucent yellow; blackish; wing veins dark brown; forewing infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Sometimes trochanters blackish and/or propleuron yellowish orange. Head (Fig. 6ab). Triangular in frontal view; face without longitudinal ridge dorsomedially; eye height/width = 1.34–1.45; eye height 0.59–0.61× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation; frons deeply excavated and crenulate with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior surface of antennal sockets rugulose; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.58–0.63× as long as eye height; clypeus 2.40–2.50× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 38–40 flagellomeres; setae at base of mandible slightly longer than setae on rest of body surface; face setose. Mesosoma (Fig.



Figure 6. *Crassomicrodonus jalisciensis*. Female **a** anterior view of head, arrow indicates a median pyramidal-shaped elevation **b** dorsal view of head, arrow indicates posterior surface of antennal sockets rugulose **c** lateral view of mesosoma, arrows indicate pronotum and subalar lobe separated from mesopleuron by wide groove **d** dorsal view of mesosoma **e** female habitus.

6cde). Pronotum strigose; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.13 to 0.15 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression punctulate; carinae of central metanotal area almost pentagonal shaped with the top inverted; propodeum reticulate rugulose; subalar lobe separated from mesopleuron by wide rugulose groove, width almost of similar size to subalar lobe; metapleuron reticulate-rugulose. Legs. Inner spur of middle tibia $0.69-0.78\times$

length of basitarsus; inner spur of hind tibia 0.61–0.78× length of basitarsus; metabasitarsus 1.24–1.26× length of tarsomeres III, IV, and V combined; hind tibia 2.50–2.63× longer than basitarsus; hind femur length 4.54–4.76× its maximum width. Wings. Forewing length/width = 2.72–3.02; stigma 3.45–3.57× longer than maximum width; forewing vein R₁ 0.63–0.69× as long as vein RS; vein RS sinuate; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.09–0.11 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.76–4.11; hind wing vein 1M 1.56–1.64× longer than 1r-m; hind wing with 5–6 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.07–3.23× wider than basal width; minimum width of petiole 0.54–0.58× apical width; length of ovipositor sheath 0.30–0.33 mm.

Male. Similar to female except color as follows: head, propleuron, pronotum, scutellum, metanotum, propodeum, mesopleuron, subalar lobe, metapleuron, coxae and trochanters black; inner spur of middle tibia almost half length of basitarsus (0.55×).

Host. Unknown

Distribution. Mexico.

Diagnosis. Distinguished from other *Crassomicrodus* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, posterior surface of antennal sockets rugulose, face setose, setae at base of mandible slightly longer than setae on rest of body surface, subalar lobe separated from mesopleuron by wide rugulose groove, and mesosoma mostly yellowish orange with wings infumate.

Remark. This species is near *C. oaxaquensis*, but differs in that *C. oaxaquensis* has the mesosoma black; wings hyaline; face with a weak longitudinal ridge dorsomedially; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles. One specimen of *C. jalisciensis* has the head and mesosoma black, but differs from *C. oaxaquensis* by leg and wing coloration.

Etymology. *C. jalisciensis* refers to the state of Jalisco, where all specimens have been found.

Material examined. Holotype ♀: MEXICO, Jalisco: 9 miles W Tepatitlán, El Refugio, 3/VII/1953, C. Vaurie & P. Vaurie. Allotype ♂: same data as holotype. Paratypes: 2 ♀ same data as holotype; Guadalajara, 1 ♀ 23–28/VII/1965, H.E. Evans (MCZ); 8 miles S Guadalajara, 1 ♀ 10/VII/1963, Parker F.D. & L.A. Stange (USNM); Guadalajara, 2 ♂ 16/VII/1951, 2 ♂ 1 ♀ 17/VII/1951, Evans H.E. (AEIC). Holotype and allotype and paratypes with same data deposited in AMNH.

***Crassomicrodus mariae* Figueroa, Sharkey & Romero, sp. n.**

urn:lsid:zoobank.org:act:D958480B-3DC0-4377-95BB-AB49F0B381F8

http://species-id.net/wiki/Crassomicrodus_mariae

Fig. 7a–e

Description female. Body. Length. 5.13–5.38 mm. Color (Fig. 7e). Integument black except yellowish-orange as follows, basal area of mandible, tegulae, femora, fore and middle tibia; medial area of hind tibia pale yellow; ocelli translucent yellow; apical

area of mandible reddish; tarsomeres and apical area of hind tibia blackish; tergum dark brown; sternum and wing veins brown; forewing lightly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 7ab). Transverse in frontal view; face with longitudinal ridge dorsomedially; eye height/width = 1.35–1.42; eye height 0.67–0.72× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation; frons not excavated; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena bulging; malar space 0.38–0.43× as long as eye height; clypeus 2.53–2.67× wider than high; length of ventrolateral margin of clypeus distinctly longer than diameter of tentorial pit; antenna with 25 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 1cde). Pronotum punctuate; lateral pronotal margins with weakly crenulate groove; notauli not impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.09 to 0.10 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth centrally and microfoveolate on the margins; carinae of central metanotal area almost circular shaped; propodeum reticulate rugulose, more pronounced on lateral margins; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; ventral one-fourth of metapleuron reticulate punctuate, remainder smooth. Legs. Inner spur of middle tibia 0.67–0.74× length of basitarsus; inner spur of hind tibia 0.52–0.53× length of basitarsus; metabasitarsus 1.35–1.42× length of tarsomeres III, IV, and V combined; hind tibia 2.21–2.30× longer than basitarsus; hind femur length 3.14–3.23× its maximum width. Wings. Forewing length/width = 2.07–2.17; stigma 2.65–2.75× longer than maximum width; forewing vein R₁ 0.48–0.50× as long as vein RS; vein RS slightly sinuate; vein r arising at middle of stigma; second submarginal cell triangular, with petiole 0.03–0.06 mm long; vein M+CU not pigmented throughout; hind wing length/width = 2.96–3.30; hind wing vein 1M 2.00–2.35× longer than 1r-m; hind wing with 4 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.17–2.38× wider than basal width; minimum width of petiole 0.70–0.77× apical width; length of ovipositor sheath 0.76–0.78 mm.

Male. Similar to female except male has 26–28 flagellomeres, carinae of central metanotal area almost pentagonal shaped, 4–5 hamuli.

Host. Unknown

Distribution. USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, frons not excavated, antenna with 25 flagellomeres, notauli not impressed, length of ovipositor sheath 0.76–0.78 mm, forewing vein R₁ 0.48–0.50× as long as vein RS, head and mesosoma black, and wings lightly infumate.

Remarks. This species is near to *C. muesebecki*, but differs in that *C. muesebecki* measures 6.08 a 6.95 mm, area between antennal sockets with a median transverse elevation and two weakly defined lateral tubercles, frons deeply excavated, antenna with 28–29 flagellomeres, pronotum more smooth, sparse setae on scutellar disc from 0.18

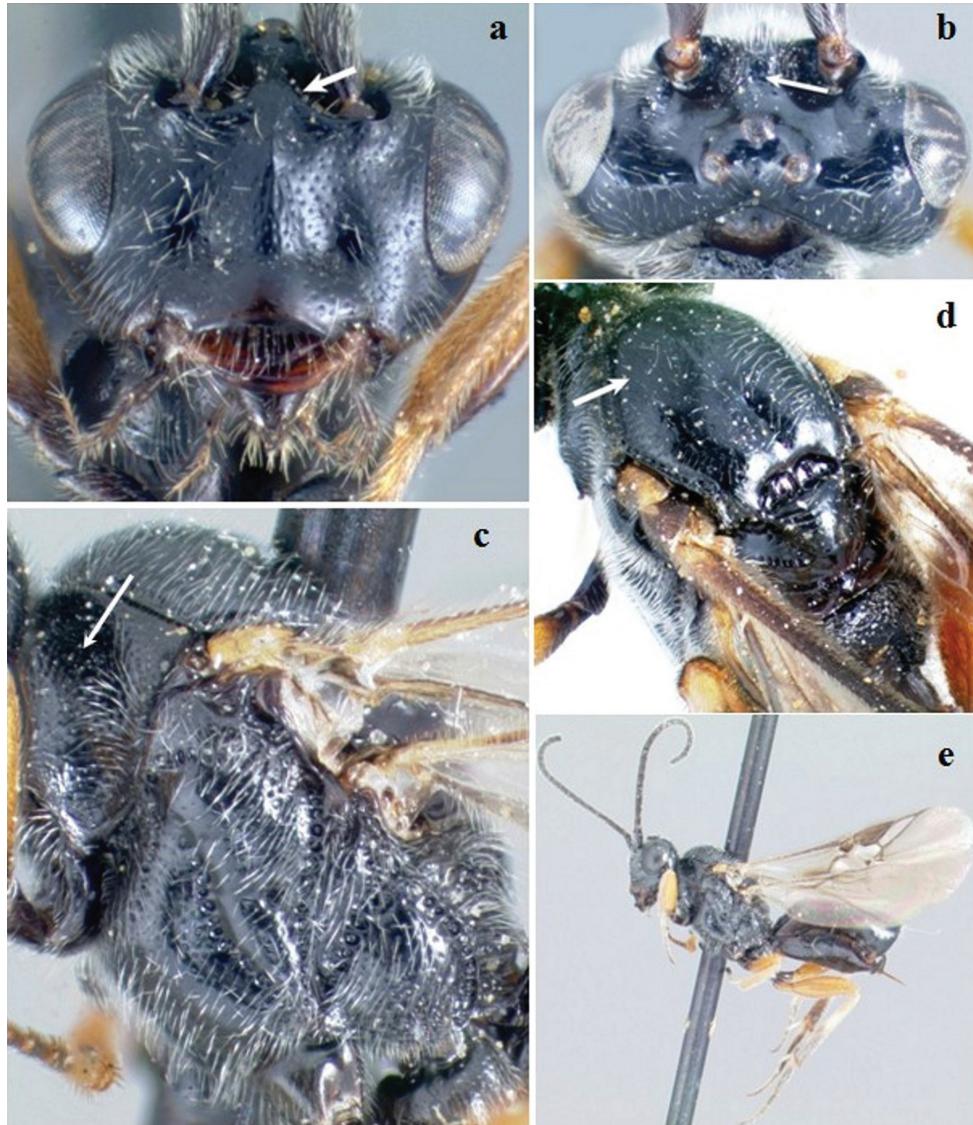


Figure 7. *Crassomicrodon mariae*. Female **a** anterior view of head, arrow indicates a median pyramidal-shaped elevation **b** dorsal view of head, arrow indicates frons not excavated **c** lateral view of mesosoma, arrow indicates punctate pronotum **d** dorsal view of mesosoma, arrow indicates notaular not impressed **e** female habitus.

to 0.20 mm in length, length of ovipositor sheath 1.83–2.33 mm, and coloration of metasoma is black.

Etymology. This species is named in honor of María Espinosa Morales, wife of the first author.

Material examined. Holotype ♀: USA, California: 5 miles W Llano, 2/V/1937, Timberlake, deposited in USNM. Allotype ♂: USA, Nevada: Patrick, Washoe Co., 22/

VI/1971, Bohart R.M., deposited in UCDC. Paratypes: USA, **California:** Apple Valley, 1 ♂ 20/V/1955, Mason W.R.M. (CNC); Colton, 1 ♀ Eddy F.A. (USNM); Hwy 76 at junc. to Mt. Palomar, San Diego Co., 1 ♂ 26/VI/1976, Coville R.E. (EMEC); Mojave Desert Love Joy Butte, 1 ♀ 10/V/1944, Melander A.L. (UCR); Sagehen Creek nr. Hobart Mills, Nevada Co., 1 ♂ 24/VI/1964, Froebe J.A. (UCDC). **Colorado:** Limon, 1 ♂ 16/VIII/1949, Dreisbach R.R. & R.K. Schwab (USNM). **Nevada:** 15 miles E Reno, Nevada Co., 1 ♂ 4/VI/1963, Irwin M.E.; 4 ♂ same data as Allotype; 1 ♂ same data as Allotype but collected by Grissell E.E. (UCDC). 2 miles Nixon Washoe Co., 1 ♀ 22/VI/1961, Parker F.D.; 12 miles NE Stillwater Churchill, 2 ♀ 3/VI/1961, Parker F.D.; Winnemucca, Humboldt Co., 1 ♀ 15/VI/1960, Parker F.D.; Winnemucca, 1 ♀ 30/V/1960, Haig T.R. (USNM). **Utah:** Wild Horse Cr., N Goblin Valley, Emery Co., 1 ♀ 3/VI/1982, 1494 m, Parker F.D. & Griswold T. (CNC).

***Crassomicrodon melanopleurus* (Ashmead, 1894)**

http://species-id.net/wiki/Crassomicrodon_melanopleurus

Fig. 8a–e

Microdon melanopleurus Ashmead 1894: 125 [Examined]. Syn. n.

Holotype male. San Jose del Cabo. Cat. No. 223 (CAS)

Description female. Body. Length. 6.10–7.75 mm. Color (Fig. 8e). Integument yellowish orange except ocelli translucent yellow reddish; antenna brown or black; eye, apical area of mandible and sometimes apical area of hind tibia and tarsomeres blackish; sometimes head and propleuron black; wing veins dark brown; forewing infumate with a hyaline spot on the first submarginal cell that is bigger than parastigma, sometimes forewing slightly infumate without distinguished the hyaline spot. Head (Fig. 8ab). Transverse in frontal view; face without longitudinal ridge dorsomedially; eye height/width = 1.38–1.39; eye height 0.67–0.69× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles; frons excavated with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior area of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena bulging; malar space 0.48–0.57× as long as eye height; clypeus 2.40–2.55× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 35–38 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 8cde). Pronotum smooth; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.09 to 0.11 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth with punctures on the ventral margin; carinae of central metanotal area forming a triangular cell; propodeum reticulate rugulose, sometimes rugose; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter

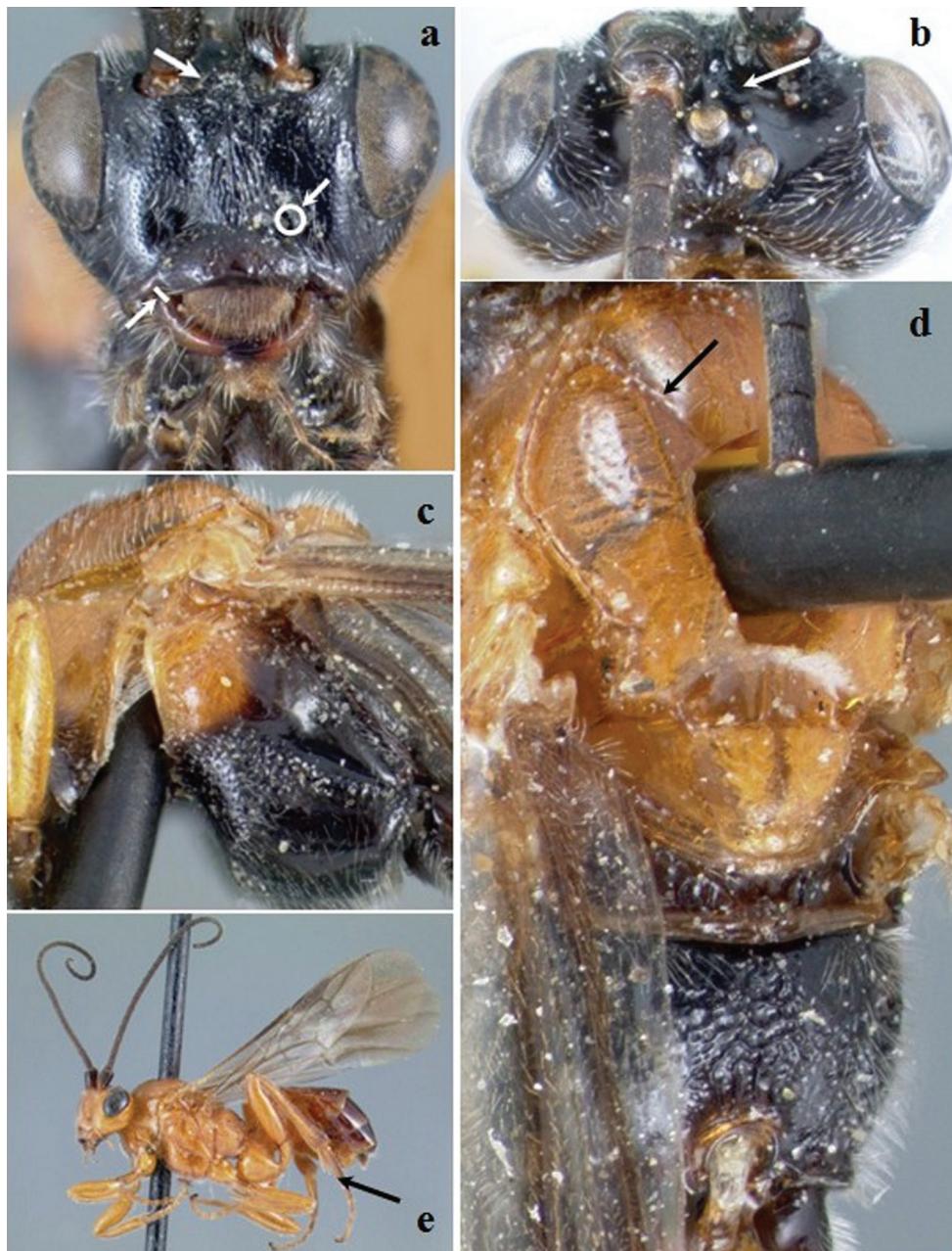


Figure 8. *Crassomicrodon melanopleurus*. Female **a** anterior view of head, arrows indicate a median pyramidal-shaped elevation with two weakly defined tubercles ventrolateral margin of clypeus, and tentorial pit **b** dorsal view of head, arrow indicates frons excavated with a pair of microfoveolate grooves **c** lateral view of mesosoma **d** dorsal view of mesosoma, arrow indicates impressed notaule **e** female habitus, arrow indicates inner spur of hind tibia.

than the subalar lobe; ventral three-fourths of metapleuron reticulate rugulose, remainder with punctures. Legs. Inner spur of middle tibia 0.77–0.86× length of basitarsus; inner spur of hind tibia 0.60–0.72× length of basitarsus; metabasitarsus 1.11–1.19× length of tarsomeres III, IV, and V combined; hind tibia 2.17–2.38× longer than basitarsus; hind femur length 3.50–3.85× its maximum width. Wings. Forewing length/width = 2.72–2.76; stigma 3.43–3.55× longer than maximum width; forewing vein R1 0.61–0.67× as long as vein RS; vein RS not sinuate; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.07–0.15 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.60–4.10; hind wing vein 1M 1.55–1.85× longer than 1r-m; hind wing with 5–8 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.00–3.70× wider than basal width; minimum width of petiole 0.54–0.56× apical width; length of ovipositor sheath 0.20–0.33 mm.

Male. Similar to female except color as follows: head, propleuron, mesopleuron, metapleuron, propodeum, coxa and trochanters black; sometimes coloration similar to female.

Host. Unknown.

Distribution. Mexico and USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, head transverse in frontal view, gena bulging, inner spur of middle tibia 0.77–0.86× length of basitarsus; inner spur of hind tibia 0.60–0.72× length of basitarsus, and body mostly yellowish orange with wings infumate.

Remarks. This species is difficult to circumscribe, the head shape and general coloration have a wide range of variation. We found some specimens with the head triangular in frontal view but they have the forewing infumate with a hyaline spot on the first submarginal cell, that occupies most of the space of the cell. Muesebeck (1927) suggested that the species could represent males of *C. fulvescens*. However the type of *M. melanopleurus* does not correspond to the characters of *C. fulvescens*, therefore we consider it to be a valid species. *Crassomicrodon melanopleurus* is very similar to *C. fulvescens*, but differs in that *C. fulvescens* has the gena distinctly bulging; frons deeply excavated; lateral scutellar depression rugose and foveolate; carinae of central metanotal defining an almost circular cell; inner spur of middle tibia 0.54–0.58× length of basitarsus; inner spur of hind tibia 0.48–0.54× length of basitarsus; and metapleuron completely reticulate-rugose.

Material examined. Holotype ♂: MEXICO, San José del Cabo (CAS). Other specimens examined.- MEXICO, San Luis Potosí: K398, 25 miles N Tamazuncha, 1 ♂ 21/VIII/1960, Howden H. (CNC). USA, California: 15 miles E Baker, Cronese Wash, San Bernardino Co., 1 ♀ 3 ♂ 17/IV/1981, Pulawski W.J. (CAS); 15 miles W Baker, San Bernardino Co., 7 ♀ y 7 ♂ 17/IV/1981, Bohart R.M. (UCDC). Banning, Riverside Co., 2 ♂ 2/VII/1952, Grigarick A.A.; 1 ♂ 2/VII/1952, Mathis H.L.; 2 ♀ 27/VI/1952, Evans E.M.; 1 ♀ 27/VII/1952, Barcus D.E.; 1 ♀ 27/VI/1952, Miyagawa

S.; 1 ♂ 28/VI/1952, Miyagawa S. (UCDC); 1 ♂ 28/VI/1952, Nakata J.H.; 1 ♂ 16/VII/1950, Adelson B. (USNM). Cronese Valley, San Bernardino Co., 1 ♂ 3/IV/1953, MacSwain J.W. (EMEC); 3 ♀ 4 ♂ 25/IV/1978, Smith N.J. (UCDC); 1 ♂ 25/IV/1978, Smith N.J. (USNM). Del Puerto Cyn, Stanislaus Co., 1 ♂ 12/VI/1978, Bohart R.M. (UCDC). Palm Springs Sta. Riverside Co., 5 ♂ 22/VII/1952, Menn J.J.; 1 ♀ y 3 ♂ 21/VII/1952, MacSwain J.W.; 1 ♂ 6/VII/1975, Linsley E.G. & J.M. Linsley (EMEC); 1 ♂ 22/VII/1952, Menn J.J. (HIC); 1 ♂ 19/V/1941, Knull D.J. & J.N. Knull (OSU); 4 ♀ 22/VII/1952, Barcus D.E. (UCDC); 1 ♀ y 2 ♂ 22/VII/1952, Menn J.J.; 1 ♂ 21/VII/1952, Thompson D.S.; 1 ♂ 22/VII/1952, Barcus D.E. (USNM). Tanbark Flat, Los Angeles Co., 2 ♀ 26/VI/1952, Anderson R.L.; Tanbark Flat, Los Angeles Co., 1 ♂ 12/VII/1952, Grigarick A.A. (UCDC); 1 ♂ 23/VII/1952, Evans E.M. (USNM). Tracy, San Joaquin Co., 1 ♂ 27/VII/1950, MacSwain J.W. (EMEC).

Crassomicrodus muesebecki Marsh, 1960

http://species-id.net/wiki/Crassomicrodus_muesebecki

Fig. 9a–e

Crassomicrodus muesebecki Marsh 1960: 153–154 [Examined].

Holotype female. 7 miles Southwest of Trimmer, Fresno County, California [USA]. June 2, 1951. Cat. No. 64876 (USNM)

Description female. Body. Length. 6.08–6.95 mm. Color (Fig. 9e). Integument black except yellowish orange as follows, femora, one-fourth basal area of hind tibia, fore and middle tibia with its tarsomeres; medial areas of mandible yellow reddish; eyes silver or blackish; ocelli translucent yellow; medial area of hind tibia pale yellow, apical area of hind tibia with its tarsomeres blackish; wing veins dark brown; forewing slightly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 9ab). Transverse in frontal view; face with weak longitudinal ridge dorsomedially; eye height/width = 1.41–1.45; eye height 0.61–0.62× inter-ocular distance; area between antennal sockets with a median transverse elevation and two weakly defined lateral tubercles, sometimes tubercles not defined; frons deeply excavated with two or more foveolae on center, posteriorly continue a pair of smooth groove that diverge towards the ocellar area, sometimes microfoveolate; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena distinctly bulging; malar space 0.46–0.50× as long as eye height; clypeus 2.30–2.50× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 28–29 flagellomeres; setae at base of mandible similar in size than setae on rest of body surface. Mesosoma (Fig. 9cde). Pronotum smooth with abundant setae on pronotal groove and lateral pronotal area; lateral pronotal margins with weakly crenulate groove; notaui not impressed; anterolateral edges of scutellum lacking small acute projection; scutellar

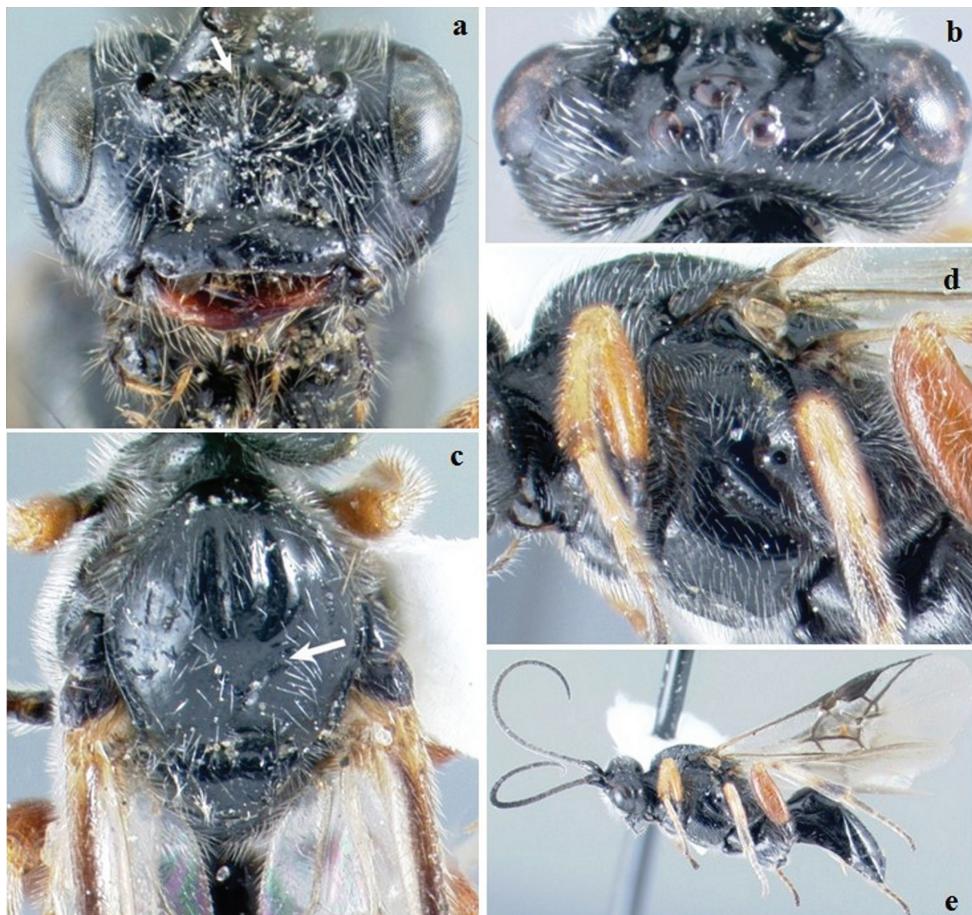


Figure 9. *Crassomicrodon muesebecki*. Female **a** anterior view of head, arrows indicate a median transverse elevation with two weakly defined tubercles **b** dorsal view of head **c** dorsal view of mesosoma, arrow indicates notaui not impressed **d** lateral view of mesosoma **e** female habitus.

disc convex with sparse setae from 0.18 to 0.20 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression microfoveolate centrally, with rugosities and foveolae on the margins; carinae of central metanotal area almost circular shaped; propodeum reticulate rugulose, more pronounced on lateral margins; subalar lobe separated from mesopleuron by narrow rugose reticulate groove, width distinctly shorter than the subalar lobe; three-fourth dorsal area of metapleuron smooth, rest reticulate-punctuate. Legs. Inner spur of middle tibia 0.72–0.86× length of basitarsus; inner spur of hind tibia 0.59–0.67× length of basitarsus; metabasitarsus 1.03–1.18× length of tarsomeres III, IV, and V combined; hind tibia 2.63–2.81× longer than basitarsus; hind femur length 3.09–3.33× its maximum width. Wings. Forewing length/width = 2.51–2.53; stigma 2.62–3.00× longer than maximum width; forewing vein R₁ 0.59–0.64× as long as vein RS; vein RS not sinuate; vein r arising at middle of stigma; second submarginal cell triangular, with

petiole 0.04–0.11 mm long; vein M+CU not pigmented throughout; hind wing length/width = 3.26–3.44; hind wing vein 1M 1.66–1.76× longer than 1r-m; hind wing with 4–5 hamuli. Metasoma. Apical width of petiole (tergum 1) 1.78–2.11× wider than basal width; minimum width of petiole 0.67–0.70× apical width; length of ovipositor sheath 1.83–2.33 mm.

Male. Similar to female.

Host. Unknown.

Distribution. USA.

Diagnosis. Distinguished from other *Crassomicrodes* species by the following combination of characters: area between antennal sockets with a median transverse elevation, gena distinctly bulging, setae at base of mandible similar in size than setae on rest of body surface, notauli not impressed, scutellar disc convex with sparse setae from 0.18 to 0.20 mm in length, length of ovipositor sheath 1.83–2.33 mm, and body black with wings slightly infumate.

Remarks. *C. muesebecki* Marsh was described with observations on 14 specimens. In this revision, we included 13 of these, one homotype and 14 additional specimens. With the inclusion of these new specimens we confirm Marsh's (1960) observation that specimens from central and northern California have infumate wings, and in almost all the hind tibiae are yellowish orange, whereas the more southern specimens have hyaline wings and the medial areas of hind tibiae pale yellow. The species status of these two groups is tentative.

Material examined. Holotype ♀: **USA, California:** 7 mi. SW Trimmer, Fresco Co. 2/VI/1951, Mac Neill C.D. (USNM). Paratypes revised: **USA, California:** Keen Camp, San Jacinto Mts., 2 ♀ 31/V/1939, Bush W.C. (EMEC); 1 ♀ 31/V/1939, Smith Ray F. (USNM). Ribbonwood, San Jacinto Mts., 1 ♀ 21/V/1940, Michener C.D. (EMEC); 1 ♀ 21/V/1940, Michener C.D. (USNM). Tuolumne County, 1 ♀ 9/VI/1938, 1067 m., Hardman N.W. (EMEC); 1 ♀ 9/VI/1938, 1067 m., Hardman N.W. (USNM). Bucks Lake, Plumas County, 1 ♀ 23/VI/1949, Cox D. (CAS). Bass Lake, Madera County, 1 ♀ 6/VI/1938, Bohart R.M.; Rucker Lake, Nevada Co., 1 ♀ 5/VII/1949, Schlinger E.I.; Rumsey, Yolo Co., 1 ♀ 30/V/1956, Bohart R.M. (UCDC). Idyllwild, San Jacinto Mountains, 1 ♂ 19/VI/1951, Bechtel G.C. (USNM). Homotype ♀: Pinon Flat, San Jacinto Mts., 15/V/1941, Van Dyke E.C. (CNC). *Other specimens examined.- California:* Genoa, 3 ♀ 2 ♂ 26/VI/1948, Townes H.M.G. & D. Townes (AEIC); Keen Camp, 2 miles W San Jacinto Mts., 1 ♀ 31/V/1939, Laningham T.E.; Tuolumne County, 1 ♂ 9/VI/1938, 1067 m. (EMEC); Ribbonwood, San Jacinto Mountains, 1 ♀ 21/V/1940, Michener C.D. (HIC); Kelso Dunes, MNP, San Bernardino Co., 1 ♂ 19/V/2001, 770 m., Hawks D. 34.53.20 N 115.43.02 W; Kelso Dunes, San Bernardino, 2 ♂ 30/V/1999, Ballmer G.R. (UCR); Keen Camp, San Jacinto Mountains, 1 ♀ 31/V/1939, Smith Ray F.; Westwood Hills, Los Angeles, 1 ♂ 27/VII/1970, Linsley E.G. (USNM). **Utah:** Leeds Cyn. Washington Co., 1 ♂ 30/V/1973, Torchio P. & F. Parker (CNC).

***Crassomicrodon nigriceps* (Cresson, 1872)**

http://species-id.net/wiki/Crassomicrodon_nigriceps

Fig. 10a–e

Crassomicrodon nigriceps (Cresson): Muesebeck 1927: 21–22 [Examined].

Microdon nigriceps Cresson 1872: 182.

Crassomicrodon fenestratus Viereck 1913: 558–559 [Examined]. Syn. n.

Holotype female. Collection Belfrage. Cat. No. 1637 (USNM)

Description female. Body. Length. 6.05–9.50 mm. Color (Fig. 10e). Coloration of this species has a wide variation, there are specimens with the body totally dark to some areas yellowish-orange or yellow reddish; forewing infumate with a hyaline spot on the first submarginal cell, that occupies most of the space of the cell. Head (Fig. 10ab). Triangular in frontal view; face with weak longitudinal ridge dorsomedially; eye height/width = 1.48–1.50; eye height 0.67–0.68× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles; frons excavated; posterior surface of antennal sockets smooth; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging, sometimes slightly bulging; malar space 0.51–0.64× as long as eye height; clypeus 1.88–2.21× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 37–43 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 10cde). Pronotum smooth, sometimes strigose; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.11 to 0.12 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth, sometimes with punctures on the ventral margins; carinae of central metanotal area forming a triangular cell; propodeum reticulate rugose; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; metapleuron reticulate rugulose. Legs. Inner spur of middle tibia 0.75–0.81× length of basitarsus; inner spur of hind tibia 0.59–0.62× length of basitarsus; metabasitarsus 1.21–1.29× length of tarsomeres III, IV, and V combined; hind tibia 2.04–2.22× longer than basitarsus; hind femur length 4.17–4.35× its maximum width. Wings. Forewing length/width = 2.70–2.76; stigma 3.57–3.85× longer than maximum width; forewing vein R1 0.62–0.69× as long as vein RS; vein RS straight; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.07–0.22 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.88–4.09; hind wing vein 1M 1.48–1.71× longer than 1r-m; hind wing with 6–8 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.33–3.43× wider than basal width; minimum width of petiole 0.49–0.60× apical width; length of ovipositor sheath 0.17–0.26 mm.

Male. Similar to female.

Host. Unknown.

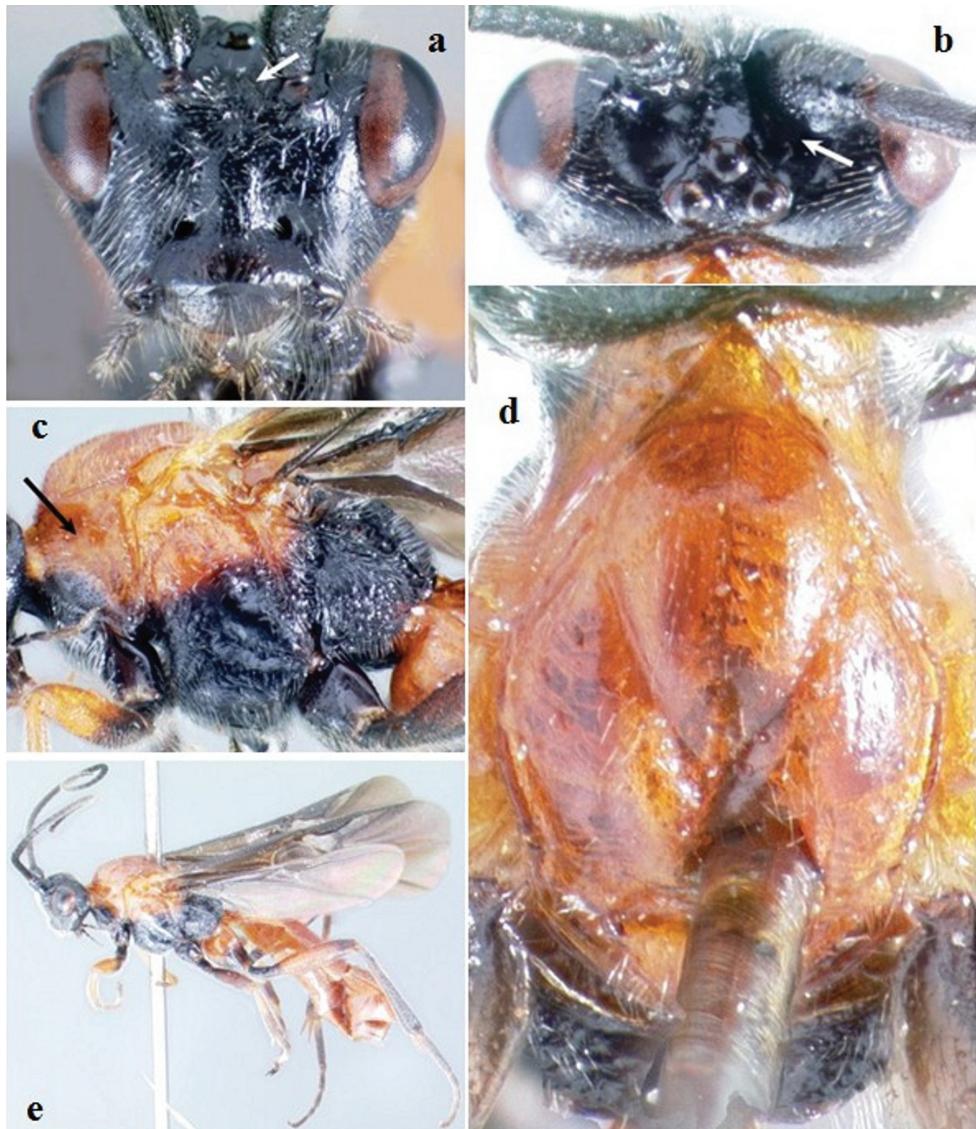


Figure 10. *Crassomicrodon nigriceps*. Female **a** anterior view of head, arrows indicate a median pyramidal-shaped elevation with two weakly defined tubercles **b** dorsal view of head, arrow indicates posterior surface of antennal sockets smooth **c** lateral view of mesosoma, arrow indicates pronotum smooth **d** dorsal view of mesosoma **e** female habitus.

Distribution. Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Haiti, Honduras, Mexico, Puerto Rico, Dominican Republic, and the USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, head triangular in frontal view, face with a few sparse setae, setae at base of

mandible distinctly longer than setae on rest of body surface, antenna with 37–43 flagellomeres, body usually with some areas yellowish-orange and wings infumate.

Remarks. This species was described as *Microdon nigriceps* by Cresson (1872). Muesebeck (1927) considered it as valid species in the genus *Crassomicrodon*; however due to the wide range of color variation among specimens of this species, it is described to *C. fenestratus* as a different species, but the types of both species have affinity of characters. *C. nigriceps* is the most variable species, on coloration and measurements, that all species of *Crassomicrodon*. Our careful examination of each specimens allowed to group them in three sub-groups; the first sub-group formed by specimens from Texas (USA), of size 7.30 to 9.50 mm and the body color yellowish-orange or yellow reddish except head, propleuron, metapleuron, propodeum, ventral area of mesopleuron, and legs black; the coloration in mesosoma of this sub-group could vary to only propleuron black and some areas of legs yellowish-orange. The second sub-group is formed by specimens from the Yucatan peninsula (Mexico), of size 6.05 to 7.95 mm and the coloration blackish on all body, although the coloration could vary to only mesoscutum yellowish-orange or yellow reddish. The last sub-group is formed by specimens from Loggerhead Key island (Florida, USA), of size 6.80 to 7.30 mm and the coloration yellowish-orange or yellow reddish except head, propleuron, metapleuron and propodeum black, ventral area of mesopleuron and legs blackish, although the coloration on mesopleuron and legs could vary. The last sub-group is where the majority of the specimens that come from other places have more affinity.

Material examined. Type ♀: *M. nigriceps*, collection Belfrage (USNM). Type ♀: *C. fenestratus* Porto Rico, C.W. Hooker (USNM). Homotypes ♀: **HONDURAS**, [Siguatepeque]: 30 km SE Siguatepeque, 11–12/VIII/1978, Chemsak J.A., E.G. Linsley & J.M. Linsley (CNC). ♂: **MEXICO**, Oaxaca: 23 miles S Matías Romero, 6/IV/1962, Parker F.D. (CNC). ♀, ♂: 27 miles SW Salina Cruz, 14/VII/1987, Wharton R. (TAMU). ♂: 63 miles E Tehuantepec, 16/IX/1967, 152 m., Painter E.M. & R.H. Painter (CNC). ♀: **NICARAGUA**, 1 miles SW Managua, 4/IX/1967, 2200 m., Painter R.H. & E.M. Painter (AEIC). Other specimens examined.- **COLOMBIA**, Tolima: Armero, 1 ♀ 30I–5II/1977, Peyton E.L. (USNM); 1 ♀ 26–30/1977, 1 ♂ 26–30/1977, Peyton & Suarez (HIC, USNM). **COSTA RICA**, [Limón]: Limón, 1 ♂ 15/II/1964, Evans H.E. (MCZ). **Guanacaste**: 10 km E Paseo Tempisque, 1 ♀ 30/VII/1990, Chamberlain W.F. (TAMU); Sector Santa Rosa; open field nr. road to Playa Naranjo, 1 ♀ 8–18/VI/1995, Dadalahi-Price & Zitani (ESUW). **CUBA**, Santiago de las Vegas 1 ♂ (USNM). **[Ciego de Ávila]**: Baraguá, 1 ♀ 19/X/1927, Scaramuzza L.C. (USNM). **[Cienfuegos]**: Ciego Montero, Cruces, L.K., 1 ♂ XII/1917, Alayo P. (HIC); Baraguá, 1 ♀ 27/VIII/1927, Scaramuzza L.C. (MCZ). **Pinar del Rio**: San Vicente, 1 ♀ 26VII–5VIII/1939, Parsons C.T. (MCZ). **DOMINICAN REPUBLIC**, [San Cristóbal]: San Cristobal Prov., 1 ♂ 5/VIII/1967 (TAMU). **EL SALVADOR**, [San Salvador]: 6 miles W Quezaltepeque, 1 ♀ 2 ♂ 12/VIII/1963, 500 m., Cavagnaro D.Q. & M.E. Irwin (CAS); 6 miles W Quezaltepeque, 1 ♀ 15/VII/1963, 500 m., Cavagnaro D.Q. & M.E. Irwin (CAS); Sonzacate, 1 ♂ 25/VI/1958, Bottimer L.J. (HIC). **GUATEMALA**, [Chiquimula]: Mocá, Guatalón, 1 ♀ III–IV/1931, 1000 m., Bequaert J. (MCZ).

[Guatemala]: Amatitlán, 1 ♀ 1 ♂ 6/VII/1947, 1219 m., Vaurie C. & P. Vaurie (AMNH); 6 miles N Amatitlan, 1 ♂ 29/XI/1972, Dasch B. & C. Dasch (AEIC). **Zacapa:** Rio Hondo, 3 ♀ VIII/1987, Sharkey M.J. (CNC, HIC). **HAITI**, Fond Parisien, 2 ♂ 11–18/II/1922, 18 m. (AMNH); Trou Caiman, 1 ♀ 1 ♂ 4/IX/1934, Bates M. (MCZ). **HONDURAS:** Nr. Corozal Brit., 1 ♀ 18/VII/1963, Porter C. (MCZ). **[Colón]:** Puerto Castilla, 1 ♂ 21/III/1924 (USNM). **El Paraíso:** Galeras, 1 ♂ 31/VII/1992, Stange L.; Yuscarán, 1 ♀ 4/VIII/1992, 840 m., Porter C. & L. Stange (FSCA). **La Paz:** La Paz, 1 ♂ 23/VI/1979, Chemsak J.A., A. Michelbacher, M. Michelbacher & W.W. Middlekauff (EMEC). **MEXICO, Baja California Sur:** 51 km W La Paz (km 51), 1 ♀ 26/VIII/1977, 275 m., Fisher E. & R. Westcott; 25 miles W La Paz, 1 ♂ 30/VIII/1959, Radford K.W. & Werner F.G. (CAS). **Campeche:** Champoton, 1 ♂ 8/VII/1964, Pallister J.C. & D. Pallister (AMNH). **Chiapas:** N. Chiapas, 3 km S Oaxaca Rte. 190, 1 ♂ 12/VIII/1962, 1524–1829 m., Milliron H.E. (CNC); 7 miles SE Soyalo, 1 ♂ 27/III/1953, Bechtel R.C. & E.I. Schlinger; Santo Domingo, 15 miles SE Simojovel, 1 ♀ 8–15/VII/1958, Smith R.F.; Suchiapa, 1 ♀ 18/VII/1957, Hurd P.D. (EMEC); Km 47 Tuxtla Gutierrez-Venustiano Carranza, 1 ♂ 10/VII/1988, 480 m., Cadena A. & L. Cervantes (IBUNAM). **Coahuila:** 6 miles W Saltillo, 1 ♂ 14/VII/1972, 5200 ft., Dasch B. & C. Dasch (AEIC). **Colima:** Armeria, 1 ♂ 1/VIII/1954, Cazier M. y W. Gertsch Bradts (AMNH); 21 miles NW Manzanillo, 2 ♂ 30/VIII/1970, Wasbauer M.S. & J.S. Wasbauer, malaise trap; Playa de Oro Rd. NW Manzanillo, 1 ♀ 1 ♂ 31/VIII/1970, Wasbauer J.S. (EMEC). **Guerrero:** Xalitla, 1 ♂ 20/III/1959, 457 m., Evans H.E. & Anderson D.M. (CUIC). **Jalisco:** Chamela, 1 ♀ 26–30/IX/1985, Parker F.D. & T.L. Griswold; El Tuito, 1 ♂ 2/X/1985, Parker F.D. & T.L. Griswold; Guadalajara, 1 ♀ VIII/1962, Hull Frank M. (CNC); 22 km E El Grullo, 2 ♀ 17/VII/1989, Griswold T., 1200 m.; Chamela Res. Sta., 1 ♀ 24/VII/1986, Sanchez M-M.T. (HIC); Rio Santiago, 15 miles N Guadalajara, 1 ♂ 22/VII/1965, Evans H.E. (MCZ); 6 miles N Autlan, 1 ♂ 7/VII/1984, Shaffner, Woolley, Carroll & Friedlander (TAMU); Tequila, 1 ♀ 6/VII/1956, Dreisbach R. & K. Dreisbach (USNM). **Michoacán:** 11 miles E Apatzingan, 3 ♀ 20/VIII/1954, Linsley E.G., J.W. MacSwain & Smith R.F. (EMEC). **Morelos:** 3 miles N Alpuyeca, 1 ♀ 4/III/1959, 1036 m., Evans H.E. & Anderson D.M.; Las Estacas, 1 ♂ 6/IV/1959, 914 m., Evans H.E. (CUIC). **Nuevo León:** Apodaca, 1 ♀ 27/VII/1963, Howden H. & A. Howden (CNC); Carr. Miguel Aleman km 15, Apodaca, 1 ♂ 10/VIII/1984, Vera A. (CIBE-UANL). **Oaxaca:** Tehuantepec, 1 ♂ 23/XI/1972, Dasch B. & C. Dasch (AEIC); 23 miles S Matias Romero, 2 ♂ 14/VIII/1963, Parker F.D. & L.A. Stange (HIC, USNM); 23 miles S Matias Romero, 1 ♂ 22/IV/1962, Parker F.D.; El Camaron, 1 ♂ 24/IV/1962, Parker F.D. (USNM); **Puebla:** 12 miles N Chapulco, 1 ♀ 29/VII/1963, Caltagirone L.E. (EMEC). **Quintana Roo:** Felipe Carrillo Puerto, 4 ♀ 10–14/X/1986, 19.35 N 88.03 W, malaise trap; 1 ♂ 10–14/X/1986, Parker F.D., 19.35 N 88.03 W; 1 ♀ 2 ♂ 12–14/X/1986, Griswold T., 19.35 N 88.03 W (CNC). 25 km W Felipe Carrillo Puerto, 1 ♀ 15/X/1986, Parker F.D., 19.35 N 88.17 W; 3 km SW Puerto Morelos, 1 ♀ 1 ♂ 7/X/1986, Parker F.D.; Coba, 2 ♂ 5/X/1986, Griswold T., 20.36 N 87.35 W (CNC). Vallarta, 17 km W Puerto Morelos, 5 ♂ 6–8/X/1986, Griswold T., 2 ♂ 6–8/X/1986,

Parker F.D., 20.50 N 87.00 W (CNC); 1 ♀ 6–8/X/1986, Griswold T. (HIC). **Sinaloa:** 34 miles N Los Mochis, 1 ♂ 27/VIII/1963, Parker F.D. & L.A. Stange (HIC); Mazatlán, 8 ♂ 15–20/VIII/1962, Evans H.E. (MCZ); Santa Ana, 1 ♀ 2/VIII/1985, Ekis G. (UCDC); Concordia, 1 ♂ 4/VII/1963, Parker F.D. & L.A. Stange (USNM). **Sonora:** Santa Ana, riv., 1 ♂ 4/VIII/1985, Ekis G. (UCDC); 19.4 miles S Estacion Llano, 2 ♀ 25/VIII/1964, Schlinger E.I., 700 m. ((USNM)). **Veracruz:** Lake Catemaco, 1 ♂ 8–16/VIII/1960, Howden H.F. (CNC); Puente Nacional, 6 miles SE Rinconada, 1 ♂ 30/IX/1975, Chemsak J. (EMEC); Veracruz, 1 ♀ 1 ♂ 28VII–11VIII/1956, Dreisbach R. & K. Dreisbach (MSUC). **Yucatán:** Uxmal, 1 ♀ 16–18/VI/1959, Vaurie P. & C. Vaurie (AMNH); Mérida, 2 ♀ 22–25/VII/1962, Evans H.E. (ESUW); 8 miles E Mérida, 1 ♂ 28/VI/1966 (HIC); Chichén Itzá, 1 ♂ 19/VII/1962, Evans H.E.; Mérida, 2 ♀ 1 ♂ 22–25/VII/1962, Evans H.E.; Uxmal, 1 ♀ 22/VII/1962, Evans H.E. (MCZ); 9 miles N Uxmal, 1 ♂ 1/VIII/1980, Schaffner, Weaver, Friedlander; Xmatkuil, Mérida, 1 ♀ 25–28/V/1996, Wharton & León, malaise trap (TAMU). 9 km N Teya Pueblo, 1 ♀ 1/IX/1999, 1 ♂ 12/X/1999, 2 ♂ 14/IX/1999, 1 ♀ 2/IX/1999, 1 ♀ 3 ♂ 3/VIII/1999, Suárez C. (UADY). **Tamaulipas:** Mesa de Llera, ca. Ciudad Victoria, 1 ♀ 1/VI/1977, Porter C. & A. Cerbone (FSCA). **PUERTO RICO**, Coamo Springs, 1 ♂ 1/VII/1915; Mayaguez, 1 ♀ 21–23/VI/1915 (AMNH); Lake Guanica, PR., 5 ♂ 30/VI/1936, Dozier H.L.; Guanica, 2 ♀ 29/VI/1914, Smith; Lajas, 1 ♂ X–XI/1960, Cotte R. (USNM). **USA, Arizona:** 1 ♂ 12/VIII/1974, Townes H. & M. Townes; Portal, 1 ♀ 17/VIII/1974, Townes H. & M. Townes (AEIC); Phoenix, 1 ♀ 2/VI/1942 (CAS); 5 miles E Nogales, Santa Cruz Co., 1 ♀ 1/IX/1970, Bohart G.E. & R.M. Bohart (CNC); 10 miles SW Patagonia, Santa Cruz Co., 1 ♀ 13/IX/1958, Cazier M.A. (EMEC). Madera Cyn., Santa Cruz Co, 1 ♀ 31/VII/1966, 1487 m., Kovacic C.R.; Box Cyn, Santa Cruz Co., 1 ♀ 26/VIII/1978, Meyer R.P. (UCDC). Wild Morning Glory, 2 ♀ 1957, Lochiel; W sl. Patagonia Mountains, 4 ♀ 9/VIII/1908, Butler G.D. & F.G. Werner (USNM). **Florida:** S. Miami 1 ♀ (MCZ). Isla Loggerhead Key, Dry Tortugas, 10 ♂ 1/IX/1961, 1 ♀ 4 ♂ 2/IX/1961, Weems H.V. Jr.; 2 miles NW Orange Spg., Putnam Co., 1 ♀ 13X–5XI/1975, Wiley J., malaise trap; Boca Chica Key, Monroe Co., 2 ♂ 11/VII/1971, Pierce W.H.; Clermont, Lake Co., 1 ♀ 29/VIII/1983, Nolfo V. (FSCA). Highlands Hamm. St. Pk. Fla., 1 ♂ 26/III/1963, Zeiger C.F.; Key Largo, 1 ♀ 2/V/1957, Weems H.V. (HIC). **Georgia:** St. Catherines Island, Liberty Co., 1 ♂ 22/V/1973, Rozen J.G. (AMNH). **Louisiana:** Gilliam, 61 ♂ /IX/1907, Bishopp F.C. (USNM). **North Carolina:** Jacksonville, Onslow Co., 1 ♀ 3/IX/1963, Bohart G.E. (CNC). **Texas:** Austin, 1 ♂ 26/VI/1922 (AMNH); 1 ♀ X/1899 (MCZ); 1 ♂ 26/VI/1922, Cazier M.A. (KSUC); 1 ♀ IX/1926, Bishopp F.C. (USNM); Benten Rio Grande State Park, Hidalgo Co., 1 ♀ 6–8/VI/1983, Pulawski W.J. (CAS). Brownsville, Cameron Co., 1 ♂ 11/IV/1976, Bruce Tilden; Sullivan City, Hidalgo Co., 1 ♂ 10/IV/1976 (CAS); Salado Creek, Bexar Co., 1 ♂ 13/III/1952, Wawbauer M. (EMEC). Fleming Key, Monroe Co., 1 ♀ 7/VIII/1979, 1 ♂ 8/VIII/1979, Acree John A. & H.V. Weems Jr., 1 ♀ 8–9/III/1980, Williams H.E. & H.V. Weems Jr. (FSCA). Valley Botanical Garden, McAllen, Hidalgo Co., 1 ♂ 12/VII/1980, 1 ♂ 23/VIII/1980, Porter C.C. (FSCA). Valley State Park, Benten Rio Grande, Hidalgo Co., 1 ♂ 4/

VI/1982, 1 ♂ 1/VI/1979, 3 ♂ 11/VI/1982, 3 ♂ 14/VI/1982, 4 ♂ 16/VI/1983, 1 ♀ 2/VIII/1980, 1 ♀ 1 ♂ 30/V/1979, 2 ♀ 3 ♂ 31/V/1979, 1 ♂ 4/VI/1983, 1 ♀ 1 ♂ 6/VI/1982, Porter C. (FSCA). Valley State Park, near Mission, Bentsen Rio Grande, Hidalgo Co., 2 ♀ 6 ♂ 1–25/VIII/1980, 2 ♂ 10/VI/1981, 1 ♀ 1 ♂ 12/VI/1981, 1 ♂ 12/VIII/1983, 1 ♀ 2 ♂ 17/VI/1983, 1 ♂ 4/VI/1981, 2 ♂ 6/VI/1981, 1 ♂ 9/VI/1981, Porter C. (FSCA). McAllen Botanical Garden, Hidalgo Co., 1 ♀ 31/V/1982, 1 ♂ 31/VI/1982, Porter C. (FSCA). McAllen Botanical Garden, McAllen, Hidalgo Co., 1 ♀ 1/VII/1985, 1 ♀ 15/VI/1985, 1 ♀ 2/VII/1985, 1 ♀ 20/VI/1984, 1 ♀ 30/VI/1985, 1 ♀ 6/VII/1983, Porter C. (FSCA). San Antonio, 1 ♀ 11/IV/1942, Melander A.L.; Wharton, Wharton Co., 1 ♂ 24/VI/1917 (MCZ). Dallas, 1 ♀ 14/IX/1905, Jones C.R.; Galveston [Galveston Co.], 1 ♂ 29/VII/1924, Tretter; Garrett, 1 ♂ 21/VII/1908, Tucker E.S.; Plano [Collin Co.], 2 ♀ 1 ♂ X/1907, E.S. Tucker. Paris [Lamar Co.], 1 ♀ 27/VIII/1905, 1 ♂ 26/VIII/1905, F.C. Bishop. Wolfe City, 1 ♀ 20/V/1907, 1 ♂ 4/VI/1909, F.C. Bishop; Victoria, 1 ♂ 25/IX/1906, Crawford J.C.; Victoria, Victoria Co., 1 ♂ 25/VI/1917; Waco, 1 ♀ 17/II/1939, Jones C.R. (USNM).

Crassomicrodus nigrithorax Muesebeck, 1927

http://species-id.net/wiki/Crassomicrodus_nigrithorax

Fig. 11a–e

Crassomicrodus nigrithorax Muesebeck 1927: 17–18 [Examined].

Holotype female. Colorado [USA]. Cat. No. 28694 (USNM)

Description female. Body. Length. 3.95–5.35 mm. Color (Fig. 11e). Integument black except yellowish as follows, three-quarter of the basal area of mandible, tegulae, femora, three-quarter of the basal area of hind tibia, fore and middle tibia, fore and middle tarsomeres, and metasoma; ocelli translucent yellow; eyes silver or blackish; wing veins clear brown; forewing slightly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Sometimes hind coxa and trochanters yellowish-orange and/or fore and middle femora, apical area of tibia, and fore and middle tarsomeres blackish, rarely tegula blackish. Head (Fig. 11ab). Transverse in frontal view; face with longitudinal ridge dorsomedially; eye height/width = 1.30–1.35; eye height 0.69–0.70× inter-ocular distance; area between antennal sockets with a median transverse elevation and two weakly defined lateral tubercles; frons excavated with a central groove almost foveolate, sometimes a pair of microfoveolate groove that diverge towards the ocellar area; posterior surface of antennal sockets smooth; groove between lateral ocelli microfoveolate; median ocellus separated from lateral ocellus by microfoveolate groove; gena bulging; malar space 0.38–0.47× as long as eye height; clypeus 2.67–2.91× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 28–31 flagellomeres; setae at base of mandible slightly longer than setae on rest of body surface. Mesosoma (Fig. 11cde). Pronotum smooth except near of subpronope rugulose; lateral pronotal mar-

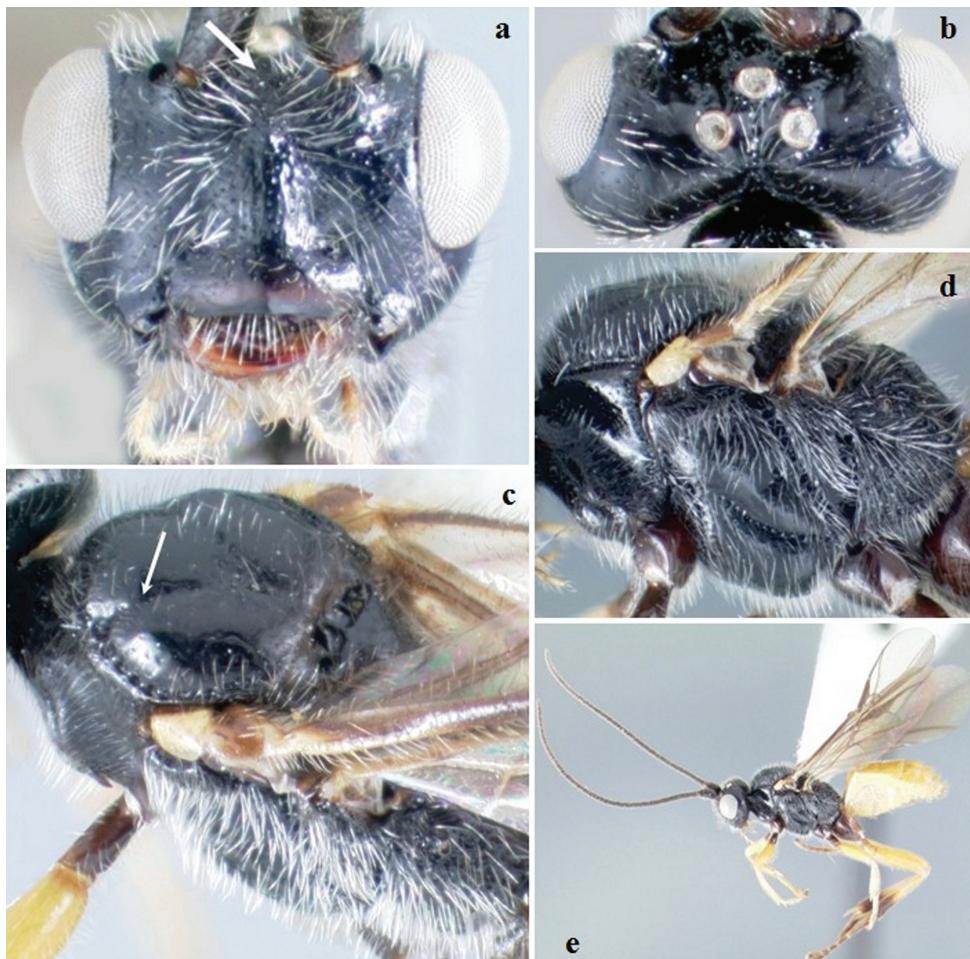


Figure 11. *Crassomicrodon nigrithorax*. Female **a** anterior view of head, arrows indicate a median transverse elevation with two weakly defined tubercles **b** dorsal view of head **c** dorsal view of mesosoma, arrow indicates notauli impressed **d** lateral view of mesosoma **e** female habitus.

gins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection, sometimes slightly the projection; scutellar disc convex with sparse setae from 0.14 to 0.15 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression rugose and foveolate on the margins and microfoveolate centrally; carinae of central metanotal area almost circular shaped; propodeum reticulate rugulose more pronounced on lateral margins, anterolateral areas with abundant setae; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; metapleuron reticulate rugulose or punctulate, more pronounced on ventral half. Legs. Inner spur of middle tibia $0.89\text{--}0.95\times$ length of basitarsus; inner spur of hind tibia $0.63\text{--}0.76\times$ length of basitarsus; metabasitarsus $1.15\text{--}1.26\times$ length of tarsomeres III, IV, and V combined; hind

tibia 1.92–2.16× longer than basitarsus; hind femur length 3.23–3.38× its maximum width. Wings. Forewing length/width = 2.46–2.60; stigma 2.95–3.08× longer than maximum width; forewing vein R1 0.65–0.68× as long as vein RS; vein RS sinuate; vein r arising before middle of stigma; second submarginal cell triangular, with petiole 0.03–0.12 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.45–3.58; hind wing vein 1M 1.83–1.97× longer than 1r-m; hind wing with 3–4 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.80–2.82× wider than basal width; minimum width of petiole 0.64–0.70× apical width; length of ovipositor sheath 0.19–0.22 mm.

Male. Similar to female.

Host. Unknown.

Distribution. Mexico and USA.

Diagnosis. Distinguished from other *Crassomicrodes* species by the following combination of characters: area between antennal sockets with a median transverse elevation, head transverse in frontal view, grooves between ocelli microfoveolate, gena bulging, antenna with 28–31 flagellomeres, anterolateral edges of scutellum usually lacking small acute projection, head and mesosoma black, and metasoma yellowish.

Remarks. This species is near to *C. apicipennis*, but differs in that *C. apicipennis* has areas of mesosoma yellowish-orange; anterolateral edges of scutellum has small acute projection; eye height 0.65–0.68× inter-ocular distance; malar space 0.48–0.55× as long as eye height; inner spur of middle tibia 0.76–0.83× length of basitarsus; and scutellar disc convex with sparse setae from 0.16–0.17 mm in length.

Material examined. Holotype ♀: Colo (USNM). Allotype ♂: Colo (USNM). Homotype ♀: **MEXICO, Guerrero:** 4 miles S Taxco, 8/VIII/1954, 1463 m., Chillcott J.G. (CNC). Other specimens examined.—**MEXICO, Baja California Sur:** Las Animas, Sierra Laguna, 1 ♂ 1 ♀ 12/X/1941, Ross & Bohart (CAS). **Guerrero:** 17 miles NW San Marcos, 1 ♂ 13/VII/1966, Wagner P.M. & P.K. Wagner (TAMU). **Jalisco:** Chamela, PT, 1 ♂ 4–9/VII/1993, Sharkey M.J. (CNC). **Morelos:** Yautepec, 1 ♀ 23/VII/1963, Parker F.D. & L.A. Stange (HIC). **Nayarit:** 18 miles NW Ixtlán del Río, 1 ♂ 25/VII/1966, Wagner P.M. & P.K. Wagner (TAMU). **Nuevo Leon:** 5 miles S Monterrey, 1 ♂ 1/VII/1963, Howden H. & A. Howden (CNC). **Oaxaca:** 27 miles SW Salina Cruz, 3 ♀ 14/VII/1987, Wharton R. (TAMU); 3 miles W Oaxaca, 1 ♂ 21/XI/1972, Dasch B. & C. Dasch (AEIC). **Puebla:** 11 miles SE Acatlan, 1 ♂ 10/VII/1952, Gilbert E.E. & C.D. McNeil; 5 miles E Tepexco, 1 ♂ 24/VIII/1977, 1250 m., Schlinger E.I. (EMEC); 3 miles N Petalcingo, 1 ♀ 2 ♂ 3/VIII/1963, Parker F.D. & L.A. Stange; Petalcingo, 1 ♀ 3/VIII/1963, Parker F.D. & L.A. Stange (USNM). **San Luis Potosí:** 6 miles S Ciudad de Valles, 1 ♂ 21/VII/1954, 61 m., Chillcott J.G. (CNC); Valles, 1 ♂ 21/VII/1946, Pallister J. & D. Pallister (AMNH). **Sinaloa:** Cutiacan, 1 ♂ 11/IX/1970, Bohart G.E. & R.M. Bohart (HIC). **Tamaulipas:** Est. Carboneros Guemez, 1 ♂ 8/IX/1988, Loyola J.C. (CIBE-UANL); 44 miles W Tampico, 1 ♀ 22/VIII/1967, Hevel Gary F. (USNM). **Tlaxcala:** 21 miles W Apizaco, 1 ♀ 20/VIII/1958, Howden H.F. (CNC). **Veracruz:** 10 miles SW Perote, 1 ♂ 27/VII/1974, Clark-Murria-Ashe & Schaffner (TAMU). **USA, Arizona:** 13 miles SW Apache, Cochise Co., 1 ♂ 13/

VIII/1970, Rozen J.G. (AMNH); Santa Cruz Sycamore Cyn. 9 miles W Peña Blanca Lk., 7 ♀ 12 ♂ 12/VIII/1983, 1250 m., Anderson R. (CNC); Tucson Mountains, 1 ♀ 1 ♂ 16/VIII/1955, Butler G.D. (USNM). **California:** Big Flat, Coffee Creek, Trinity Co. 1 ♀ 21/VI/1934, Van Dyke E.C. (CAS); 6 miles W Tragedy Spr., Amador Co., 1 ♀ 16/VII/1960, Rice R.E.; Donner Pass, 1 ♂ 1/VIII/1948, Townes H.M.G. & D. Townes (HIC); Westgard Pass, Inyo Co., 2 ♀ 16/V/1979, Bohart R.M.; 5 miles E Woodland, Yolo Co., 1 ♀ 10/IX/1970 (UCDC); Yuba, Sierra Co. 1 ♂ 6/VII/1962, Irwin M.E.; Quatal Canyon, NW corner Ventura Co., 1 ♀ 1 ♂ 9/V/1959, Powell J.; Davis, 1 ♂ 10/V/1960, Parker F.D. (USNM). **Colorado:** Colo 1 ♀ (HIC); **New Mexico:** Hatch, 1 ♀ 27/VIII/1974, Townes H. & M. Townes (CNC); Hatch, 1 ♀ 30/VIII/1974, Townes H. & M. Townes (AEIC). **Oregon:** Cave Jct., 1 ♂ 27/V/1978, Townes H. & M. Townes (AEIC). **Utah:** Strbry Daniel Pass, 1 ♀ 18/VI/1948, Townes H.M.G. & D. Townes (AEIC).

***Crassomicrodon oaxaquensis* Figueroa, Romero & Sharkey, sp. n.**

urn:lsid:zoobank.org:act:EF0FBCCA-7C2F-4AA6-8C0F-A4DAE53AEBF2

http://species-id.net/wiki/Crassomicrodon_oaxaquensis

Fig. 12a–e

Description female. Body. Length 7.10–7.65 mm. Color (Fig. 12e). Integument black except yellowish-orange as follows, ocelli, fore tibia, two-thirds apical areas of fore and middle femur, two-thirds basal areas of middle tibia and metasoma; medial area of mandible yellow reddish; eyes silver; wing veins dark brown; forewing almost hyaline. Sometimes first metasomal tergite black, and the yellowish-orange of legs is reduced to only the apical area of fore and middle femora and apical area of fore tibia. Head (Fig. 12ab). Triangular in frontal view; face with weak longitudinal ridge dorsomedially; eye height/width = 1.34–1.45; eye height 0.60–0.62× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles; frons excavated with a pair of microfoveolate grooves that diverge towards the ocellar area; posterior surface of antennal sockets rugulose; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.55–0.58× as long as eye height; clypeus 2.25–2.44× wider than high; length of ventrolateral margin of clypeus almost similar to diameter of tentorial pit; antenna with 38–39 flagellomeres; setae at base of mandible slightly longer than setae on rest of body surface; face very setose. Mesosoma (Fig. 12cde). Pronotum punctate; lateral pronotal margins with weakly crenulate groove; notauli impressed; antero-lateral edges of scutellum lacking small acute projection; scutellar disc slightly convex with sparse setae from 0.15 to 0.16 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression rugulose and punctate; carinae of central metanotal area forming a triangular cell; propodeum reticulate rugulose with abundant sparse setae on lateral areas; subalar lobe separated from mesopleuron by wide rugose groove, width almost of similar size to subalar lobe; metapleuron reticulate rugulose in its ventral half

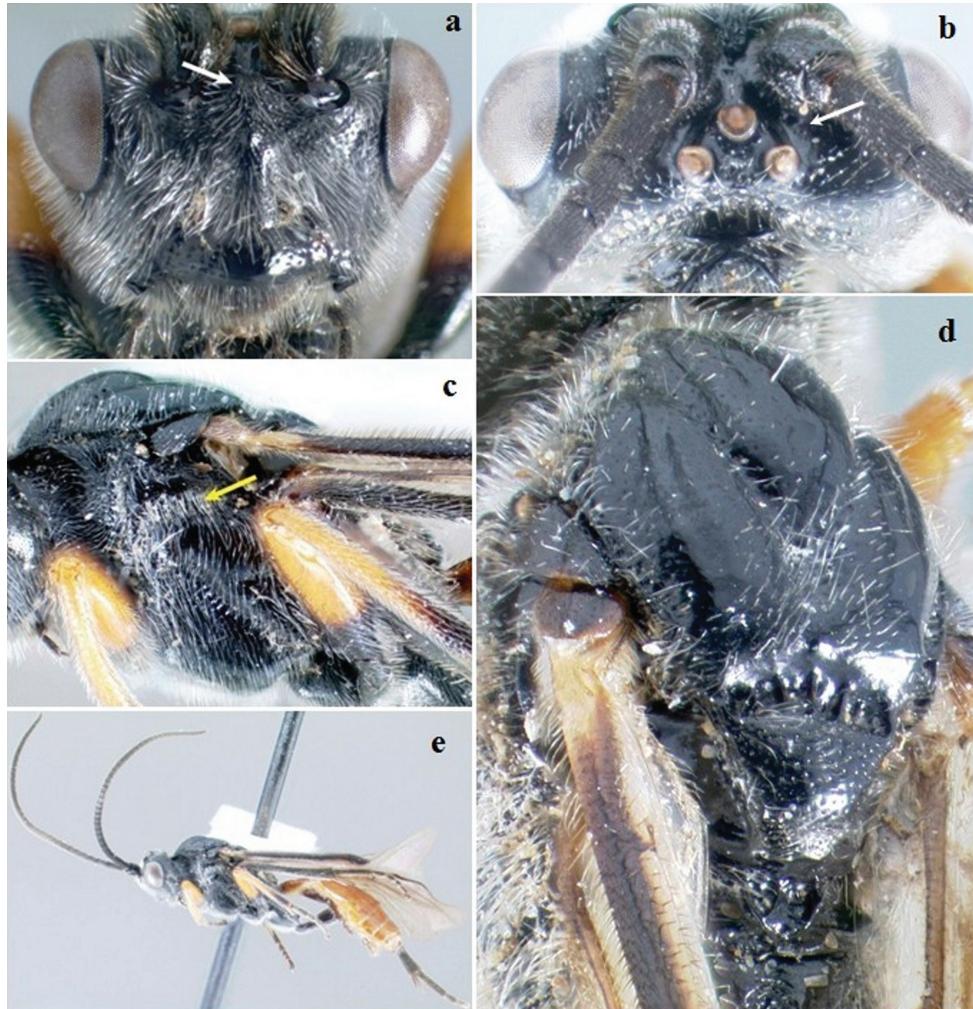


Figure 12. *Crassomicrodon oaxaquensis* sp. n. Female **a** anterior view of head, arrows indicate a median pyramidal-shaped elevation with two weakly defined tubercles **b** dorsal view of head, arrow indicates posterior surface of antennal sockets rugulose **c** lateral view of mesosoma, arrow indicates subalar lobe separated from mesopleuron by wide groove **d** dorsal view of mesosoma **e** female habitus.

and smooth or punctuate in its dorsal half. Legs. Inner spur of middle tibia $0.68\text{--}0.73\times$ length of basitarsus; inner spur of hind tibia $0.58\text{--}0.66\times$ length of basitarsus; metabasitarsus $1.25\text{--}1.32\times$ length of tarsomeres III, IV, and V combined; hind tibia $2.33\text{--}2.38\times$ longer than basitarsus; hind femur length $4.64\text{--}4.76\times$ its maximum width. Wings. Forewing length/width = $2.57\text{--}2.76$; stigma $2.91\text{--}3.33\times$ longer than maximum width; forewing vein R1 $0.65\text{--}0.70\times$ as long as vein RS; vein RS sinuate; vein r arising before middle of stigma; second submarginal cell triangular, with petiole $0.08\text{--}0.09$ mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = $3.70\text{--}3.73$; hind wing vein 1M $1.79\text{--}1.82\times$ longer than 1r-m; hind wing with 5 hamuli. Metasoma.

Apical width of petiole (tergum 1) 3.00–3.41× wider than basal width; minimum width of petiole 0.46–0.47× apical width; length of ovipositor sheath 0.22–0.26 mm.

Male. Similar to female except metasomal tergite has the color dark brown, antenna with 39 or 40 flagellomeres, and hind wing with 4 or 5 hamuli.

Host. Unknown.

Distribution. Mexico.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, head triangular in frontal view, posterior surface of antennal sockets rugulose, face very setose, setae at base of mandible slightly longer than setae on rest of body surface, subalar lobe separated from mesopleuron by wide rugose groove, head and mesosoma black, and wings almost hyaline.

Remarks. This species is near to *C. jalisciensis*, but differs in that *C. jalisciensis* has areas of mesosoma yellowish orange, wings infumate, face without longitudinal ridge dorsomedially, and a median elevation between antennal sockets without defined lateral tubercles.

Etymology. *C. oaxaquensis* is after Oaxaca, in reference to the known geographical distribution of the species.

Material examined. Holotype ♀: MEXICO, Oaxaca: Llano de las Flores, 15 miles NE Ixtlán de Juárez, 21/VII/1985, Woolley & Zolnerowich. Allotype ♂: same data as holotype. Paratypes 1 ♀, 2 ♂: same data as holotype. All types deposited in TAMU.

Crassomicrodon olgae Figueroa, Sharkey & Romero, sp. n.

urn:lsid:zoobank.org:act:B4527E95-134E-4DD0-B8B3-00637C850D46

http://species-id.net/wiki/Crassomicrodon_olgae

Fig. 13a–e

Description female. Body. Length. 6.70–7.08 mm. Color (Fig. 13e). Integument black except yellowish-orange as follows, medial area of mandible, femora, fore tibia, basal half of middle and hind tibia, and metasoma; ocelli translucent yellow; wing veins brown; forewing slightly infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 13ab). Transverse in frontal view; face with longitudinal ridge dorsomedially; eye height/width = 1.38–1.39; eye height 0.68–0.74× inter-ocular distance; area between antennal sockets with a median trapezoidal-shape elevation and two weakly defined tubercles; frons deeply excavated; posterior surface of antennal sockets smooth; groove between lateral ocelli slightly microfoveolate; median ocellus separated from lateral ocellus by smooth groove; gena distinctly bulging; malar space 0.54–0.59× as long as eye height; clypeus 2.08–2.19× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 32 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 13cde). Pronotum with the pronotal groove reticulate rugulose and lateral areas smooth; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum with

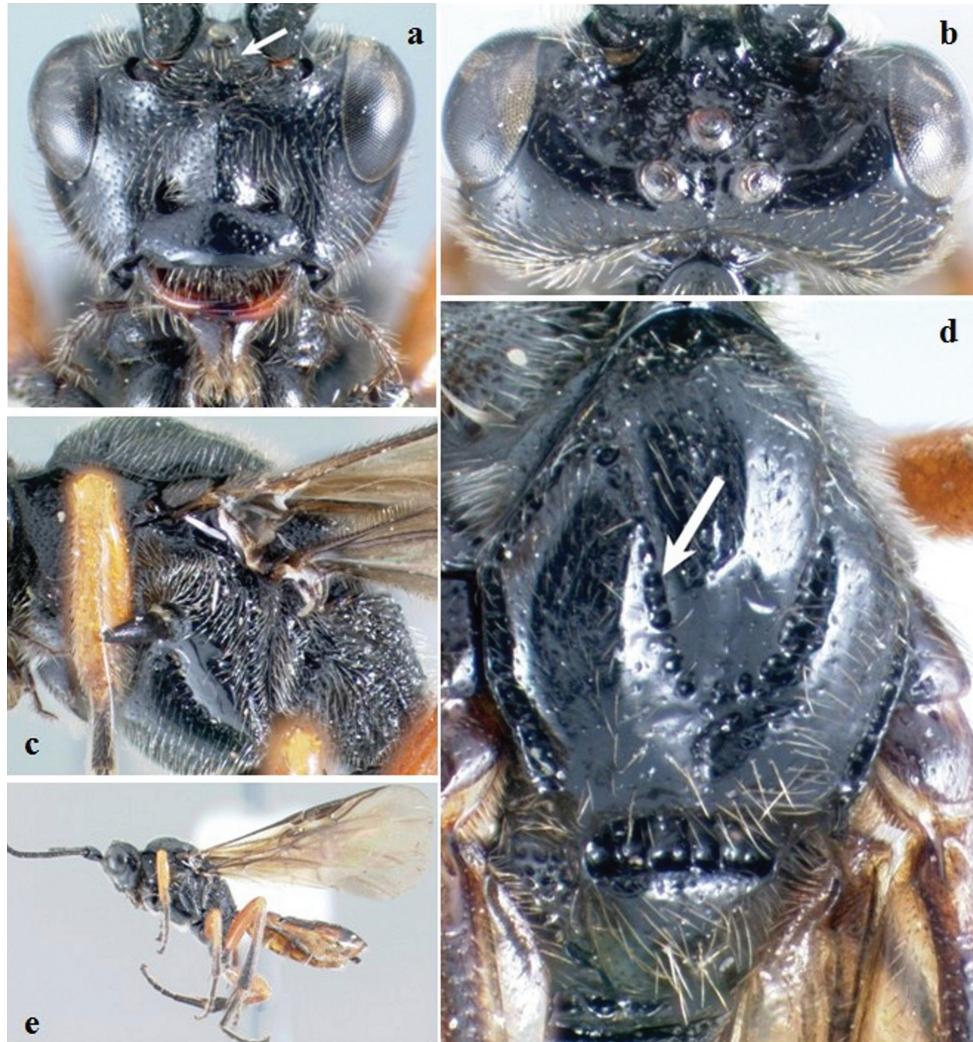


Figure 13. *Crassomicrodon olgae* sp. n. Female **a** anterior view of head, arrows indicate a median elevation in trapezoidal shape with two weakly defined tubercles **b** dorsal view of head **c** lateral view of mesosoma **d** dorsal view of mesosoma, arrow indicates notauli impressed **e** female habitus.

slight acute projection, sometimes without projection; scutellar disc convex with sparse setae from 0.16 to 0.17 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression with punctures centrally and foveolae in its margins; carinae of central metanotal area almost circular shaped; propodeum reticulate rugose, more pronounced on lateral margins; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; metapleuron reticulate rugulose or foveolate in its ventral half and smooth in its dorsal half. Legs. Inner spur of middle tibia $0.85\text{--}0.92\times$ length of basitarsus; inner spur of hind tibia $0.58\text{--}0.65\times$ length of basitarsus; metabasitarsus $1.11\text{--}1.32\times$ length of tarsomeres III, IV, and V combined; hind tibia $2.00\text{--}2.17\times$ long-

er than basitarsus; hind femur length 3.50–3.85× its maximum width. Wings. Forewing length/width = 2.45–2.71; stigma 3.17–3.58× longer than maximum width; forewing vein R1 0.61–0.63× as long as vein RS; vein RS slightly sinuate; vein r arising slightly before middle of stigma; second submarginal cell triangular, with petiole 0.11–0.13 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.36–3.76; hind wing vein 1M 1.83–1.85× longer than 1r-m; hind wing with 4 hamuli. Metasoma. Apical width of petiole (tergum 1) 2.88–3.18× wider than basal width; minimum width of petiole 0.48–0.55× apical width; length of ovipositor sheath 0.17–0.20 mm.

Male. Similar to female except that male has 31–34 flagellomeres, fore and middle femora and tibia yellowish-orange, hamuli with 4 or 5 hooks; sometimes the petiole color blackish.

Host. Unknown.

Distribution. USA.

Diagnosis. Distinguished from other *Crassomicrodon* species by the following combination of characters: area between antennal sockets with a median trapezoidal-shape elevation, head transverse in frontal view, gena distinctly bulging, groove between lateral ocelli slightly microfoveolate, anterolateral edges of scutellum usually with slightly acute projection, head and mesosoma black and wings slightly infumate.

Remarks. This species is near to *C. oaxaquensis*, but differs in that *C. oaxaquensis* has a triangular-shaped head, area between antennal sockets with a median pyramidal-shaped elevation, gena not bulging, and antenna with 38–39 flagellomeres.

Etymology. This species is named in honor of Olga Margot De la Rosa Reyes, mother of the first author.

Material examined. Holotype ♀: **USA, California:** Shingle, El Dorado Co., 22/V/1955, Burdick D.J. Allotype ♂: same data as holotype. Holotype and allotype deposited in EMEC. Paratypes: **California:** Tahoe National Forest, Pineland Drive 3.2 km S Tahoe City, Placer County, 1 ♂ 20/VII/1983, 1900 m., Davies Thomas W. (CAS); 4 miles S Railway Flat, Calaveras Co., 2 ♂ 19/V/1969, 853 m., Linsley E.G.; Shingle, El Dorado Co., 1 ♂ 22/V/1955, Burdick D.J. (EMEC); River Pines, Amador Co., 1 ♂ 26/IV/1975 (UCDC); Volcano, Amador Co., 1 ♂ 5/V/1957, Moore C.G. (USNM). **Utah:** 23 miles NE Logan, Cache Co., 1 ♀ 20/VI/1963, Toschi C.A. (EMEC).

Crassomicrodon pallens (Cresson, 1873)

http://species-id.net/wiki/Crassomicrodon_pallens

Fig. 14a–e

Crassomicrodon pallens (Cresson): Muesebeck 1927: 20.

Microdon pallens Cresson 1873: 53.

Holotype female. Illinois [USA]. Cat. No. 2746 (ANSP).

Description female. Body. Length. 4.20–6.48 mm. Color (Fig. 14e). Integument yellowish-orange except ocelli translucent yellow; eyes black or silver; mandible

apex and apical area of hind tibia and tarsomeres blackish. Sometimes propleuron black with metapleuron and propodeum blackish, rarely head and mesopleuron blackish. Wing veins dark brown; forewing infumate with a hyaline spot on the first submarginal cell that is similar in size to the parastigma. Head (Fig. 14ab). Triangular in frontal view; face without longitudinal ridge dorsomedially; eye height/width = 1.36; eye height 0.55–0.58× inter-ocular distance; area between antennal sockets with a median pyramidal-shaped elevation and two weakly defined tubercles; frons excavated with a pair of microfoveolate groove that diverge towards the ocellar area; posterior surface of antennal sockets smooth, rarely rugulose; groove between lateral ocelli smooth; median ocellus separated from lateral ocellus by smooth groove; gena not bulging; malar space 0.77–0.86× as long as eye height; clypeus 1.63–2.00× wider than high; length of ventrolateral margin of clypeus similar to diameter of tentorial pit; antenna with 29–34 flagellomeres; setae at base of mandible distinctly longer than setae on rest of body surface. Mesosoma (Fig. 14cde). Pronotum strigulose or reticulate rugulose; lateral pronotal margins with weakly crenulate groove; notauli impressed; anterolateral edges of scutellum lacking small acute projection; scutellar disc convex with sparse setae from 0.09 to 0.11 mm in length; scutellar disc sloped posteriorly and rounded; lateral scutellar depression smooth, rarely with punctures on the ventral margins; carinae of central metanotal area almost triangular shaped; propodeum reticulate rugulose; subalar lobe separated from mesopleuron by narrow rugulose groove, width distinctly shorter than the subalar lobe; metapleuron reticulate-rugulose. Legs. Inner spur of middle tibia 0.74–0.81× length of basitarsus; inner spur of hind tibia 0.61–0.72× length of basitarsus; metabasitarsus 1.02–1.12× length of tarsomeres III, IV, and V combined; hind tibia 2.22–2.39× longer than basitarsus; hind femur length 3.44–3.85× its maximum width. Wings. Forewing length/width = 2.46–2.55; stigma 3.00–3.44× longer than maximum width; forewing vein R1 0.47–0.57× as long as vein RS; vein RS not sinuate; vein r arising slightly before middle of stigma; second submarginal cell triangular, with petiole 0.05–0.09 mm long; vein M+CU distinctly pigmented throughout; hind wing length/width = 3.10–3.39; hind wing vein 1M 1.41–1.53× longer than 1r-m; hind wing with 4–5 hamuli. Metasoma. Apical width of petiole (tergum 1) 3.60–3.92× wider than basal width; minimum width of petiole 0.58–0.63× apical width; length of ovipositor sheath 0.20–0.33 mm.

Male. Similar to female.

Host. Unknown.

Distribution. Mexico and USA.

Diagnosis. Distinguished from other *Crassomicrodus* species by the following combination of characters: area between antennal sockets with a median pyramidal-shaped elevation, head triangular in frontal view, malar space 0.77–0.86× as long as eye height, body length 4.20–6.48 mm, forewing vein R1 0.47–0.57× as long as vein RS, body usually yellowish-orange.

Remarks. *Crassomicrodus pallens* resembles *C. divisus* in the shape of the head, but differs by the characters in the key. A few specimens of this species have the malar space



Figure 14. *Crassomicrodon pallens*. Female **a** anterior view of head, arrows indicate a median pyramidal-shaped elevation with two weakly defined tubercles **b** dorsal view of head **c** lateral view of mesosoma **d** dorsal view of mesosoma **e** female habitus.

shorter than eye height (0.77 times), specimens with this variation also have R1 less than 0.57 times as long as vein RS.

Material examined. Type: 1 ♀: Ill. (ANSP). Homotype: 1 ♀, USA, South Carolina: Hilton Head Island, 17/VII/1965, Howden H. & A. Howden (CNC).

Other specimens examined.- MEXICO, Colima: 21 miles N Manzanillo, 1 ♀ 25/VIII/1970, Wasbauer M.S. & J.S. Wasbauer (CNC). **Nayarit:** Arroyo Santiago, Nr. Jesus Maria, 2 ♀ 5/VII/1955 (CNC, EMEC). **Sinaloa:** 2.5 miles N Mazatlán, 1 ♀ 12/VIII/1970, Wasbauer M., malaise trap (CNC); 35 miles S Es-

cuinapa, 1 ♂ 24/IV/1961, Howden & Martin (HIC). **Sonora:** Alamos, 2 ♀, 1 ♂ 5/IX/1970, Bohart R.M (UCDC); La aduana W Alamos, 1 ♀ 18/VIII/1964, Irwin M.E. (USNM); 5 miles E Navojoa, 1 ♀ 9/IX/1970, Bohart R.M. (UCDC). **Veracruz:** Minatitlán, 1 ♀ 1/II/1992, Osborn H. (USNM). **USA, Alabama:** Alabama, 2 ♀ 1980; Auburn, Lee Co., 1 ♀ 9/VI/1917; Tuskegee, 1 ♂ 22/VII/1930, Beamer R.H. (USNM). **Arkansas:** Washington Co. 1 ♀ 11/X/1955, Baker T.A. at light (USNM); Shoal Bay Rec. Area, 1 ♂ 20/V/1981, Dasch B. & C. Dasch (AEIC). **Connecticut:** East Hartford, 1 ♀ 13/VI/1947, Evans Howard E.; Riverbank, East Hartford, 1 ♀ 20/IX/1946, Evans Howard E. (CNC). **Florida:** 1 ♂ (CNC). Tarpon Sprs., 1 ♂ 20/III/1950, Townes H.K.; Cedar Key, 1 ♂ 28/III/1985, Townes H. & M. Townes; Elfes, 1 ♀ 4/IV/1937, Franclemont J.G.; 5 miles NE Bronson, Levy Co., 1 ♂ 29/III/1986, LaSalle John (AEIC); De Funiak Springs, 1 ♂ 17–19/X/1914; Crestview, 1 ♂ 15–16/X/1914 (AMNH); Pine Hill Estates, Gainesville, 1 ♂ 4/X/1973, Weems H.V. Jr., malaise trap (CNC); Archbold Biol. Sta., Highlands Co., 1 ♀ 28VII10VIII/1987, Wahl D.B. (HIC); Fleming Key, Monroe Co., 2 ♀ 14/VIII/1979, Acree John A. & H.V. Weems Jr. insect flight trap; 1 miles W Interlachen, Putnam, 1 ♀, 5 ♂ 16/IV/1984, Stange L.A.; 2 miles N Holt, Okaloosa Co., 1 ♂ 28/X/1983, Stange L.A.; Gainesville, Alachua Co., 1 ♂ 1/VIII/1977, 1 ♀ 31/VII/1977, Davis L.R. Jr.; Interlachen, Putnam Co., 2 ♂ 4/V/1986, Stange L.A.; Monteoca, Alachua Co., 1 ♀ 26/IX/1977, 1 ♀ 3/X/1977, Butler F. Jerry; Nokomis, Sarasota Co., 1 ♂ 9/I/1967; Palmdale, Glades County, 1 ♂ 25/VI/1972, Pierce W.H.; Pine Hill Estates, Gainesville, 1 ♀ 2/X/1973, 1 ♀ 20/IX/1973, 1 ♀ 29/IX/1973, 1 ♀ 30/IX/1973, Weems H.V. Jr., malaise trap; San Felasco Hammock, Alachua Co., 1 ♀ 17/III/1977, Fairchild G.B. & Weems H.V. Jr.; Suwanne Riv. St. Pk., Suwannee Co., 1 ♀ 13–25/IV/1977, Wiley J.R. (FSCA); San Felasco Hammock, Alachua Co., 1 ♀ 9–14/III/1977, Fairchild G.B. (UCDC); Arcadia, 1 ♂ 2/VII/1962, 1 ♂ 3/VII/1962, Krombein Karl V.; Alachua Co., 1 ♂ 4/VII/1955, Weems H.V.; Gainesville, 1 ♀ 28/VIII/1960, Stange L.A. (USNM). **Georgia:** 2 ♀ (USNM); Pine Mtn. Rabun Co., 1 ♂ 1/VIII/1957, 457 m., Chillcott J.G. (CNC); 10 miles N Waycross, Ware Co., 1 ♂ 27/VIII/1960, Marsh P.M.; Lakeland, 1 ♂ 18/IV/1940, Fattig P.W. (USNM). **Illinois:** 1 ♂ VIII (USNM); Havana, 1 ♂ 18/VIII/1912, Devil's Hole; Meredosia, 1 ♂ 22/VIII/1917; St. Anne, 1 ♂ 22/VII/1935, Ross & DeLong (INHS); Carbondale, Jackson Co., 1 ♀ 28/IX/1956, Downey J.C. (USNM). **Indiana:** Forest Nursery, Jackson Co. 1 ♂ 23/IX/1938, Schnell R.L. (USNM). **Iowa:** Sioux City, 1 ♂ 15/VII/1927, Ainslie C.N. (USNM). **Kansas:** Lawrence, 1 ♀ 12/VI/1960, Menke A.S. (UCDC); 1 ♂ Baldwin, V, Bridwell J.C.; Lawrence vicinity, Douglas Co., 1 ♂ 29/VI/1962, Roberts R. (USNM). **Maryland:** Beltsville, 1 ♂ 23/V, Krombein K.V.; College Park, 1 ♂ 17/VIII/1914 (USNM); Crownsville, 1 ♀ 14/VII/1956, Krombein Karl V. (HIC). **Massachusetts** 2 ♂ (USNM); Truro 1 ♀, 1 ♂ 4/IX/1904, Morse A.P. (MCZ); Cabo Cod, 1 ♀ 6/IX/1939, Dreisbach R.R. (MSUC); Nantucket, 1 ♂ 7/IX/1909; Nantucket, 1 ♂ 8/IX/1926, Johnson C.W. (USNM). **Michigan:** Newago Co., 1 ♂

13/VI/1940, Dreisbach R.R. (AEIC); Newago Co., 2 ♂ 30/VII/1944, Dreisbach R.R. (MSUC, USNM). **Minnesota:** Ft. Snelling, 1 ♀ 2/VIII/1923, Hertig A.T.; Ft. Snelling, 2 ♀ 28/VII/1922, Nichol A.A.; John Latsch St. Pk., S Minneiska, 1 ♀ 1/V/1951; Jordan, 1 ♀ 15/IX/1930, Talford H.S.; Jordan, sand area, 1 ♀ 13/VII/1923, Hertig A.T. (UMSP). **Missouri:** Columbia, 1 ♂ 29/IX/1964, Bayer L.G. (AEIC); Williamsville, 1 ♀ 1–16/VI/1969, Becker J.T., malaise trap (CNC); Columbia, 1 ♀ 20/VII/1967, Parker F.D. (UCDC); Taney Co., 1 ♀, 1 ♂ 13/IX/1944, Portman R.W. (UMRM); Columbia, 1 ♀ 22/VIII/1967, Parker F.D., malaise trap; Columbia, 1 ♀ 26/X/1931, Craig W.S. (USNM). **Nebraska:** Valentine Refuge, 1 ♀ 4/VI/1972, 1 ♂ 6/VI/1972, Townes H. & M. Townes (AEIC); Custer Co., 1 ♂ 21/VIII/1951, Dreisbach R.R. (MSUC). **New Jersey:** Palmyra, 1 ♀ 29/VIII/1933, Cazier M.A. (AMNH); Bergenfield, 1 ♂ VIII/1918?, Schott F.M.; Lucaston, 1 ♂ 12/IX/1902, Daecke E. (USNM). **New Mexico:** Hatch, 1 ♀ 29/VIII/1974, 1 ♀ 30/VIII/1974, Townes H. & M. Townes (AEIC). Riverton, 2 ♂ 5/IX/1948; Westville, 1 ♀ 12/IX/1897 (USNM). **New York:** Cold Springs Harb, 1 ♂ 25/VII, Melander A.L. (AEIC). **North Carolina:** Clinton, 1 ♂ 24/V/1951, Townes H. & M. Townes; Nags Head, 1 ♂, 1 ♀ 25/V/1948, Krombein K.V.; Smokemont, 1 ♂ 15/VIII/1947, Bullock & Dreisbach (AEIC); Fort Bragg, Cumberland Co., 1 ♀ 27IX/3X/1967, Birchim Jim D. (CAS); Cabo Hatteras mt. Buxton, 1 ♂ 14/VIII/1961, Howden H.; Highlands, 1 ♂ 4/VI/1957, 1158 m., Vockeroth J.R. (CNC). Jacksonville, Onslow Co., 1 ♂ IX/1963; Kill Devil Hills, 2 ♂ 26/VI/1954, 1 ♀ 2/VII/1954, Krombein Karl V.; (HIC); Kill Devil Hills, 2 ♀, 6 ♂ 1/VII/1954, 1 ♀ 2/VII/1954, 1 ♀ 22/VI/1954, 2 ♂ 23/VI/1954, 1 ♀, 7 ♂ 26/VI/1954, 1 ♂ 28/VI/1954, 1 ♂ 3/VII/1954, 1 ♀, 8 ♂ 30/VI/1954, Krombein Karl V.; Raleigh, 1 ♂ 20/V/1937 (UMSP); Salvo, Dare Co., 1 ♂ 6/VIII/1958, Krombein (USNM); Southern Pines, 1 ♀ 3/V/1951, Howden H. & A. Howden; 1 ♀ 16/IX/1956, Krombein Karl V.; 1 ♂ 16/VIII (AEIC, USNM). **North Dakota:** 7 miles SE Sheldon, Ransom Co., 1 ♂ 5/VIII/1973, Powers J.R.; 11 miles W Walcott, Richland Co., 2 ♀ 23/V/1988, Powers J.R. (EMEC). **Oklahoma:** Lake Texoma 2 miles E Willis, 1 ♂ VI/1965, Bohart R.M. (UCDC); Cimarron River near Freedom, Woods Co. 1 ♀ 11/V/1984, Hevel G.F. & J.F. Hevel (USNM). **Pennsylvania:** Dauphin, 1 ♂ 6/VI/1909, Daecke E. (USNM); Philadelphia, 1 ♂, 1991?, Fox (USNM). **Rhode Island:** Providence 1 ♂ (USNM). **South Carolina:** Greenville, 1 ♂ 2/X/1941, 1 ♂ 8/X/1941, Townes H. & M. Townes (AEIC). **Tennessee:** Jefferson City, 2 ♀ 7/VII/1947, Valentine B.D. (CNC). **Texas:** Junction, Kimble Co., 1 ♀ 5/V/1986, Pulawski W.J. (CAS); Seagoville cerca Dallas, 2 ♀ XI/1944, Weyrauch (IMLA); Austin 1 ♂ (MCZ); Huntsville, Chartman 1 ♂; New Boston, 1 ♂ 17/X/1905, Bishopp F.C.; Pierce, 1 ♂ 22/IV/1907, alfalfa, Mitchell J.D. (USNM). **Virginia:** Ft. Humphreys, 1 ♂ 6/IX/1928, Mickel C.E. (UMSP); Barcroft, 1 ♂ 2/IX/1934, Bridwell J.C.; Falls Church, 1 ♀ 30/VIII/1923, Greene C.T.; Nelson Co., 1 ♀ 17/VIII/1927, Robinson W.; Rosslyn, 1 ♀ V/1929; Tazewell, 1 ♀ 9/VI/1915, Jackson L.O. (USNM). **Wisconsin:** Griffith St. Nursery, Wood Co., 1 ♂ 8/VI/1948, Shenefelt R.D. (AEIC).

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